

FINAL
**ENVIRONMENTAL ASSESSMENT
ADDRESSING THE
EXPANSION OF SORTIE-OPERATIONS
AT
MOODY AIR FORCE BASE, GEORGIA**



**23RD WING
MOODY AIR FORCE BASE, GEORGIA**



AUGUST 2012

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

ENVIRONMENTAL ASSESSMENT (EA) ADDRESSING THE EXPANSION OF SORTIE-OPERATIONS AT MOODY AFB, GEORGIA

Pursuant to the Council on Environmental Quality's (CEQ's) regulations for implementing procedural provisions of the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] 1500-1508), 32 CFR Part 989, the U.S. Air Force Air Combat Command (ACC) has prepared an Environmental Assessment (EA) for the expansion of sortie-operations associated with Moody Air Force Base (AFB) aircraft and airmen. The EA is incorporated by reference into this Finding of No Significant Impact (FONSI).

INTRODUCTION

The 23rd Wing (23 WG) is the host unit at Moody AFB and is a component of ACC. As an ACC installation, Moody AFB fulfills ACC's mission as the primary provider of combat airpower to America's unified combatant commands. Moody AFB airmen use various military airspace components and bombing ranges for proficiency training in specific areas of Georgia, Florida, South Carolina, and Alabama. To accommodate the training required by Moody AFB airmen, various existing airspace components and ranges, including Military Operations Areas (MOAs), bombing ranges, and a Low-Altitude Tactical Navigation (LATN) area would be used at higher utilization rates. The use of these airspace areas and the associated increase in utilization were assessed in the EA.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to increase training opportunities with the aircraft stationed at Moody AFB. Increases in sortie-operations and weapons expenditures within existing military airspace and training ranges would enable Moody AFB airmen to complete required readiness training operations and ensure that mission capabilities are sustained.

The need for the Proposed Action is to increase aircraft operations and weapons expenditures over and above those analyzed in the 2006 *Base Realignment and Closure Commission (BRAC) Environmental Assessment, Moody Air Force Base, Georgia* (hereafter referred to as the "2006 BRAC EA"). The sortie-operation estimates for airspace areas and ranges usage by Moody AFB aircraft, as evaluated in the 2006 BRAC EA, are not at the level sufficient to meet current operational needs for the installation. At the time the 2006 BRAC EA was written, the A-10 aircraft were not stationed at Moody AFB. Once the 48 primary authorized aircraft (PAA) arrived and began training, the actual number of training sorties was reassessed and the need to increase training at MOAs and a range was identified. The 23rd Fighter Group (23 FG) needs to conduct additional sorties with the A-10 aircraft stationed at Moody AFB to meet increased training requirements to ensure airmen are ready to deploy in support of current and future Overseas Contingency Operations. These requirements include increases in air-to-air training and air-to-ground weapons delivery. The proposed increase would support military readiness and provide realistic training to ensure aircrews are mission-trained, qualified, and prepared for deployment to support real-world events.

A-10 pilots need to train at a range with a tactical target in order to complete tactical training that is required as part of their Mission Qualification Training. The Mission Qualification Training program is a unit-developed plan that incorporates the profiles typical of squadrons to ensure pilots are prepared to accomplish the primary unit mission. Tactical training includes use of ordnance, threat simulators, countermeasures, and dissimilar aircraft to the maximum extent possible. In addition, the range proposed for use must be a "scoreable range," or a range where the pilot's weapons delivery can be scored. Weapons delivery qualifications require A-10 pilots to complete air-to-surface weapons event

requirements on scoreable tactical ranges to the maximum extent practical. At the end of the training cycle, each pilot's weapons delivery scores are reviewed to assess the pilot's qualification.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Proposed Action. The Proposed Action consists of the expansion of sortie-operations within existing airspace components and ranges and a corresponding weapons expenditure rate increase on an existing range to ensure required mission readiness training requirements. A sortie consists of a single military aircraft flight from initial takeoff through final landing. A sortie-operation is defined as the use of one airspace unit (e.g., a MOA, range, or Restricted Area) by one aircraft. Sortie-operations apply to flight activities outside the airfield airspace environs. Each time a single aircraft flies in a different airspace unit, one sortie-operation is counted for that unit. Realistic training is required to ensure aircrews are mission-trained, qualified, and prepared for deployment to support real-world events, which include the tactical delivery of air-to-ground munitions, laser designation of targets from ground and airborne platforms, and threat evasion. These events would occur in existing airspace components and ranges and are necessary to meet the training requirements for Moody AFB airmen. There would be no personnel changes or construction activities as part of the Proposed Action. All of the airspace components and ranges analyzed in this EA are currently in existence; the creation of new airspace areas is not part of the Proposed Action.

No Action Alternative. Under the No Action Alternative, the Proposed Action would not be implemented. The number of annual sortie-operations and the corresponding weapons expenditure rates would not increase for Moody AFB aircrews, resulting in reduced training time and a potential increase in operating costs as ranges further from Moody AFB would have to be used to accomplish required training actions.

SUMMARY OF ANTICIPATED ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED ACTION AND THE NO ACTION ALTERNATIVE

In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, the evaluation of potential environmental impacts presented in the EA focuses on those resources and conditions potentially subject to impacts and on potentially significant environmental issues deserving of study, and deemphasizes insignificant issues. Some environmental resources and conditions that are often analyzed in an EA were omitted from detailed analysis. Geological resources, water resources, and infrastructure, were eliminated from detailed examination because of their inapplicability.

There would be no change in personnel or construction activities required as part of the Proposed Action. Implementation of the Proposed Action would not result in the need to reconfigure current military airspace, impose any major restrictions on air commerce opportunities, significantly limit airspace access to large numbers of users over current conditions, or require modifications to air traffic control systems.

Based on the analyses addressing the Proposed Action presented in the EA, it was determined that no significant adverse impacts on airspace management would be expected. The Proposed Action would not involve changes in land use and would not preclude the viability of existing land use. No impacts are expected on architectural or archeological resources at Moody AFB or for the areas underlying the airspace. Long-term, minor, adverse impacts would be expected to increase slightly under the Proposed Action on the following resources areas: aircraft safety, the acoustical environment, land use, air quality, and biological resources. Minor adverse effects on these resource areas would be expected because of increased utilization of airspace and ranges, expenditure rates of ammunition, and noise associated with Moody AFB aircraft.

Under the No Action Alternative, the Proposed Action would not be implemented. The number of annual sortie-operations and the corresponding weapons expenditure rates would not increase for Moody AFB aircrews, resulting in reduced training time and a potential increase in operating costs as ranges further from Moody AFB would have to be used to accomplish required training actions. Based on the analyses addressing

the No Action Alternative presented in the EA, it was determined that no significant impacts on environmental resources would be expected.

PUBLIC REVIEW AND INTERAGENCY COORDINATION

ACC initiated the Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process for the Proposed Action on 17 April 2009, in accordance with USAF policy. A 30-day public and agency review of the Description of Proposed Action and Alternatives for this EA was previously conducted.

A Notice of Availability (NOA) for this EA was published in local newspapers. The published NOA solicits comments on the Proposed Action and is intended to involve the local community in the decisionmaking process. Comments received from the public and other Federal, state, and local agencies were addressed in the EA.

FINDING OF NO SIGNIFICANT IMPACT

I conclude that the environmental effects of the proposed airspace utilization levels for Moody AFB aircraft are not significant, that preparation of an Environmental Impact Statement is unnecessary, and that a FONSI is appropriate. The preparation of the EA is in accordance with NEPA, CEQ regulations, and 32 CFR Part 989, as amended and is herein incorporated by reference.



BILLY D. THOMPSON, Colonel, USAF
Commander, 23d Wing



Date

Attachment: Environmental Assessment

ABBREVIATIONS AND ACRONYMS

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter	dba	A-weighted decibels
23 FG	23rd Fighter Group	dbc	C-weighted decibels
23 MSG	23rd Mission Support Group	DOD	Department of Defense
23 WG	23rd Wing	EA	Environmental Assessment
347 RQG	347th Rescue Group	EIS	Environmental Impact Statement
563 RQG	563rd Rescue Group	EO	Executive Order
ACC	Air Combat Command	EOD	explosive ordnance disposal
ACHP	Advisory Council on Historic Preservation	EPD	Environmental Protection Division
ADEM	Alabama Department of Environmental Management	ERP	Environmental Restoration Program
AFB	Air Force Base	ESA	Endangered Species Act
AFI	Air Force Instruction	FAA	Federal Aviation Administration
AGL	above ground level	FAR	Federal Aviation Regulation
APE	area of potential effect	FDEP	Florida Department of Environmental Protection
APZ	accident potential zone	FONSI	Finding of No Significant Impact
AQCR	Air Quality Control Region	FY	fiscal year
ATCAA	Air Traffic Control Assigned Airspaces	GDNR	Georgia Department of Natural Resources
ARTCC	Air Route Traffic Control Center	GRASI	Gulf Regional Airspace Strategic Initiative
ATC	air traffic control	IERA	Institute for Environment, Safety, and Occupational Health Risk Analysis
BASH	bird/wildlife aircraft strike hazard	IFR	instrument flight rules
BDU	bomb dummy unit	IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
BRAC	Base Realignment and Closure	JLUS	Joint Land Use Study
CAA	Clean Air Act	LATN	Low-Altitude Tactical Navigation
CAU	Classic Associate Unit	L _{dn}	day/night average sound level
CEQ	Council on Environmental Quality		
CFR	Code of Federal Regulations		
CO	carbon monoxide		
CSAR	Combat Search and Rescue		
CZ	clear zone		

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L _{dnmr}	onset rate-adjusted day/night average sound level
MCAS	Marine Corps Air Station
mg/m ³	milligrams per cubic meter
MOA	Military Operations Area
MR_NMAP	MOA and Range NOISEMAP
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Airspace System
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	nautical mile
NO ₂	nitrogen dioxide
NOA	Notice of Availability
NOTAM	Notice to Airmen
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O ₃	ozone
OEIS	Overseas Environmental Impact Statement
PAA	Primary Authorized Aircraft
Pb	lead
P.L.	Public Law
PM ₁₀	particulate matter equal to or less than 10 microns in diameter
PM _{2.5}	particulate matter equal to or less than 2.5 microns in diameter
ppm	parts per million
PSD	Prevention of Significant Deterioration

R	Restricted Area
RAPCON	Radar Approach Control
RCO	Range Control Officer
RCRA	Resource Conservation and Recovery Act
ROA	Range Operation Authority
ROD	Record of Decision
ROI	region of influence
SCDHEC	South Carolina Department of Health and Environmental Control
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SP	State Protected
SSC	species of special concern
SUA	Special Use Airspace
SULMA	Special Use Land Management Area
tpy	tons per year
U.S.C.	United States Code
ULZ	unimproved landing zone
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
VFR	visual flight rules
WDZ	weapon danger zone

COVER SHEET

FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING THE EXPANSION OF SORTIE-OPERATIONS AT MOODY AIR FORCE BASE, GEORGIA

Responsible Agencies: U.S. Air Force (USAF), 23rd Wing (23 WG), Moody Air Force Base (AFB), Georgia.

Affected Location: Moody AFB, Georgia.

Report Designation: Final Environmental Assessment (EA).

Abstract: The USAF proposes the expansion of sortie-operations within existing airspace components and ranges and a corresponding weapons expenditure rate increase on existing ranges to ensure the accomplishment of readiness training requirements for Moody AFB aircraft and airmen. Realistic training is required to ensure aircrews are mission-trained, qualified, and prepared for deployment to support real-world events, which include the tactical delivery of air-to-ground munitions, laser designation of targets from ground and airborne platforms, and threat evasion. These training events would occur in existing airspace components and ranges associated with training for Moody AFB. There would be no personnel changes or construction activities as part of the Proposed Action.

This EA analyzes and documents potential environmental consequences associated with the Proposed Action and reasonable alternatives to the Proposed Action at Moody AFB and the associated airspace and ranges. If the analyses presented in this EA indicate that implementation of the management alternatives would not result in significant environmental or socioeconomic impacts, a Finding of No Significant Impact (FONSI) would be prepared. If significant environmental issues are identified that cannot be minimized to insignificant levels, an Environmental Impact Statement (EIS) would be prepared or the Proposed Action would be abandoned and no action would be taken. The EA is to be made available to government agencies and the public upon completion. The EA will evaluate the potential environmental consequences on the following 11 resource categories: geological resources, water resources, infrastructure, airspace management and flight safety, noise, land use, socioeconomic resources and environmental justice, cultural resources, air quality, biological resources, and hazardous materials and wastes.

Written comments and inquiries regarding this document should be sent to Ms. Rebecca Lopez, 23 CES/CEAO, 3485 Georgia Street, Moody AFB, GA 31699.

Privacy Advisory

Your comments on this document are requested. Letters or other written or oral comments provided may be published in the EA. As required by law, comments will be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to comment on this document or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and the specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

**FINAL ENVIRONMENTAL ASSESSMENT ADDRESSING THE
EXPANSION OF SORTIE-OPERATIONS AT
MOODY AFB, GEORGIA**

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1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 Background

Moody Air Force Base (AFB) is an Air Combat Command (ACC) installation in southern Georgia (see **Figure 1-1**). Airmen operating out of the installation use various military airspace components and bombing ranges for proficiency training in specific areas of Georgia, Florida, South Carolina, and Alabama (see **Figure 1-2**). Moody AFB consists of 10,843 acres in Lowndes and Lanier counties (see **Figure 1-3**). The installation is approximately 10 miles northeast of the City of Valdosta.

The 23rd Wing (23 WG) is the host unit at Moody AFB and is a component of ACC. As an ACC installation, Moody AFB fulfills ACC's mission as the primary provider of combat airpower to America's unified combatant commands. The 23 WG organizes, trains, and employs combat-ready A-10C (a fighter aircraft hereafter referred to as A-10), HC-130 (a transport aircraft), HH-60 (a search and rescue helicopter), pararescuemen, and force protection assets and personnel. The 23 WG consists of approximately 6,000 military and civilian personnel, including geographically separated units in Nevada, Florida, and Arizona. The 23 WG executes worldwide close air support, force protection, and combat search and rescue (CSAR) operations in support of humanitarian interests, U.S. national security, and Overseas Contingency Operations. The 23 WG is composed of six groups; five at Moody AFB and one at Davis-Monthan AFB in Arizona. The 23rd Fighter Group (23 FG), 347th Rescue Group (347 RQG), 23rd Mission Support Group (23 MSG), 23rd Medical Group, 23rd Maintenance Group, and the 563rd Rescue Group (563 RQG) all operate under the 23 WG. The 23 FG Flying Tigers direct the flying and maintenance operations for the U.S. Air Force's (USAF) largest A-10 fighter group. The 347 RQG directs flying and maintenance of the only USAF active-duty Operations Group dedicated to CSAR. The mission of the 347 RQG is completed through the operation of HC-130 aircraft and HH-60 helicopters. The mission of the 23 MSG is to train, equip, and deploy personnel support forces to build, protect, and sustain air bases worldwide for combat air operations. The 563rd Rescue Group directs flying operations for the USAF's only active duty rescue wing dedicated to CSAR. The group is responsible for training, readiness, and maintenance of one HC-130 squadron and two HH-60 squadrons, two pararescue squadrons, two maintenance squadrons, and an operations support squadron operating from two geographically separated operating locations. Between the various units at Moody AFB, the A-10 and HC-130 transport aircraft and HH-60 helicopters are flown.

There are two active parallel runways at Moody AFB: the eastern runway (Runway 18L/36R) and the western runway (Runway 18R/36L). Both runways are oriented in a north-south direction; Runway 18L/36R is 9,300 feet long by 150 feet wide, and Runway 18R/36L is 8,000 feet long by 150 feet wide.

There have been recent Base Realignment and Closure- (BRAC) related changes at Moody AFB. Consequently, requirements for updating environmental documentation for the use of airspace areas necessitate the preparation of this Environmental Assessment (EA). This EA expands existing environmental information on continued operations at Moody AFB and the surrounding airspace and assesses the potential impacts associated with using various airspace components and air-to-ground ranges for military training purposes. To accommodate the training required by Moody AFB airmen, various existing airspace components and ranges, including Military Operations Areas (MOAs), bombing ranges, and a Low-Altitude Tactical Navigation (LATN) area would be used at higher utilization rates. Such use and the associated increase in use will be assessed in this EA. The existing airspace areas that will be reviewed in this EA are shown in **Table 1-1**. All of these airspace areas are currently used by Moody AFB airmen. Maps and airspace coordinates associated with the locations of each of these various training areas and routes can be found in **Appendix A**.

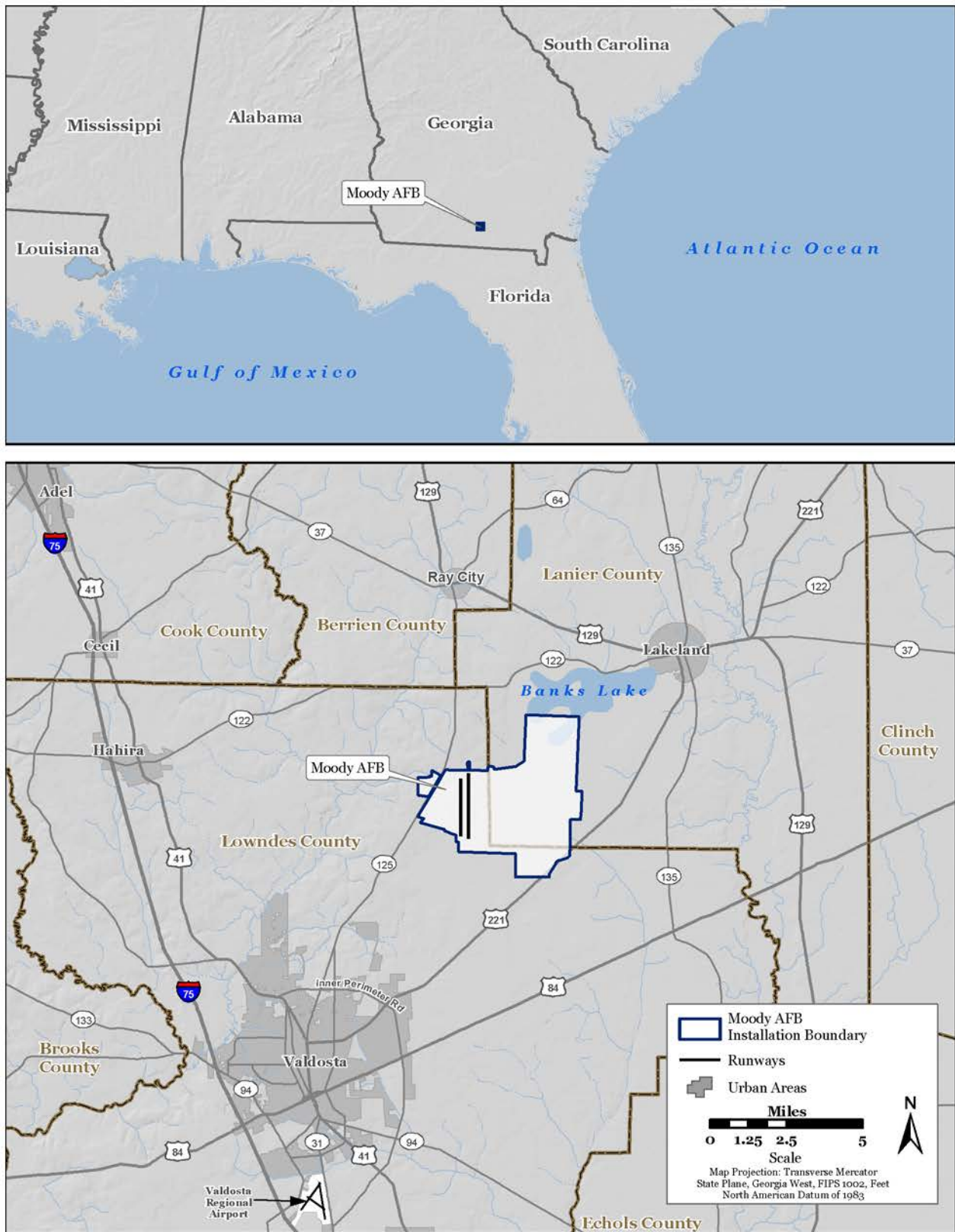


Figure 1-1. Moody AFB Vicinity Map

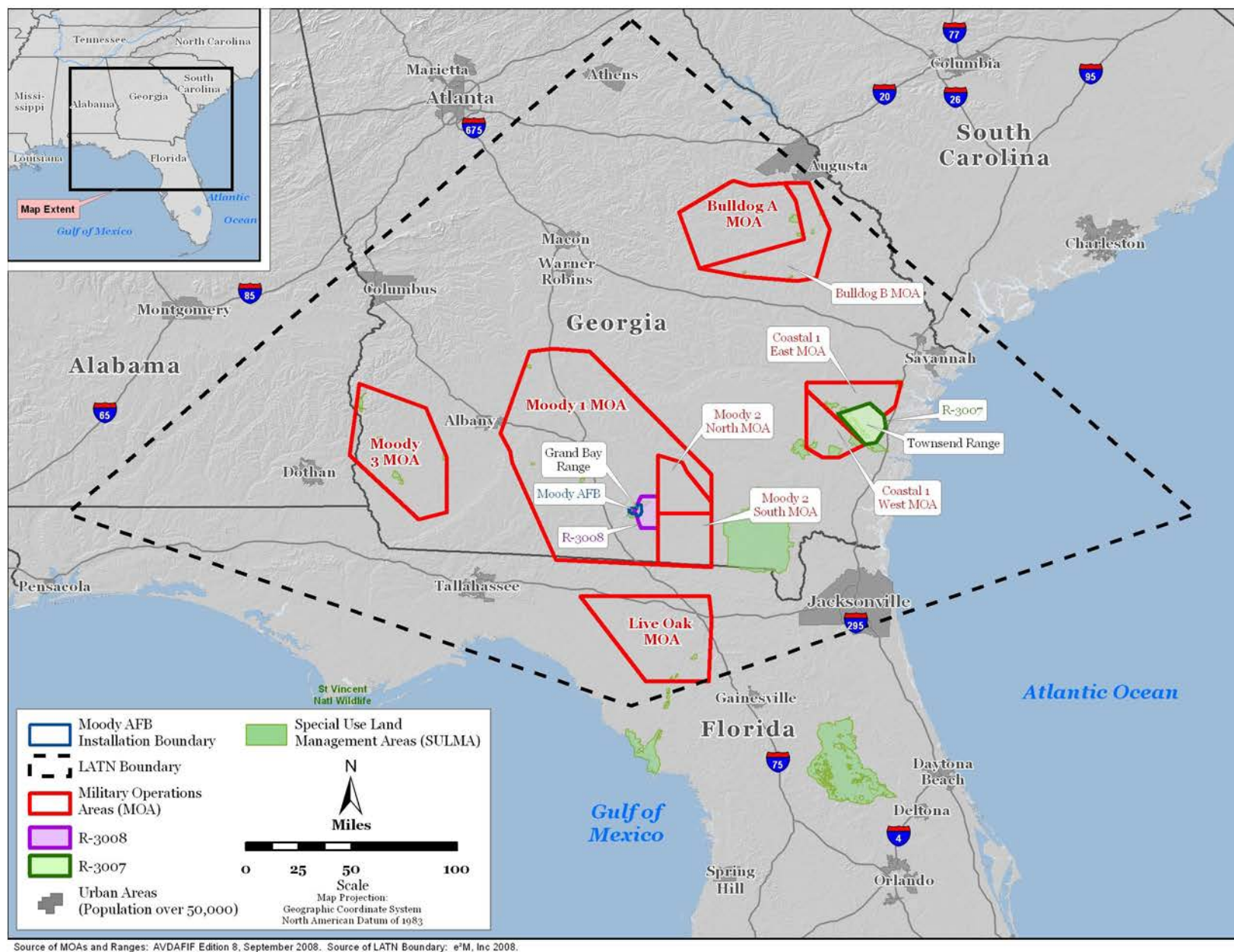


Figure 1-2. Assessed Airspace Components and Bombing Ranges Used by Moody AFB Aircraft

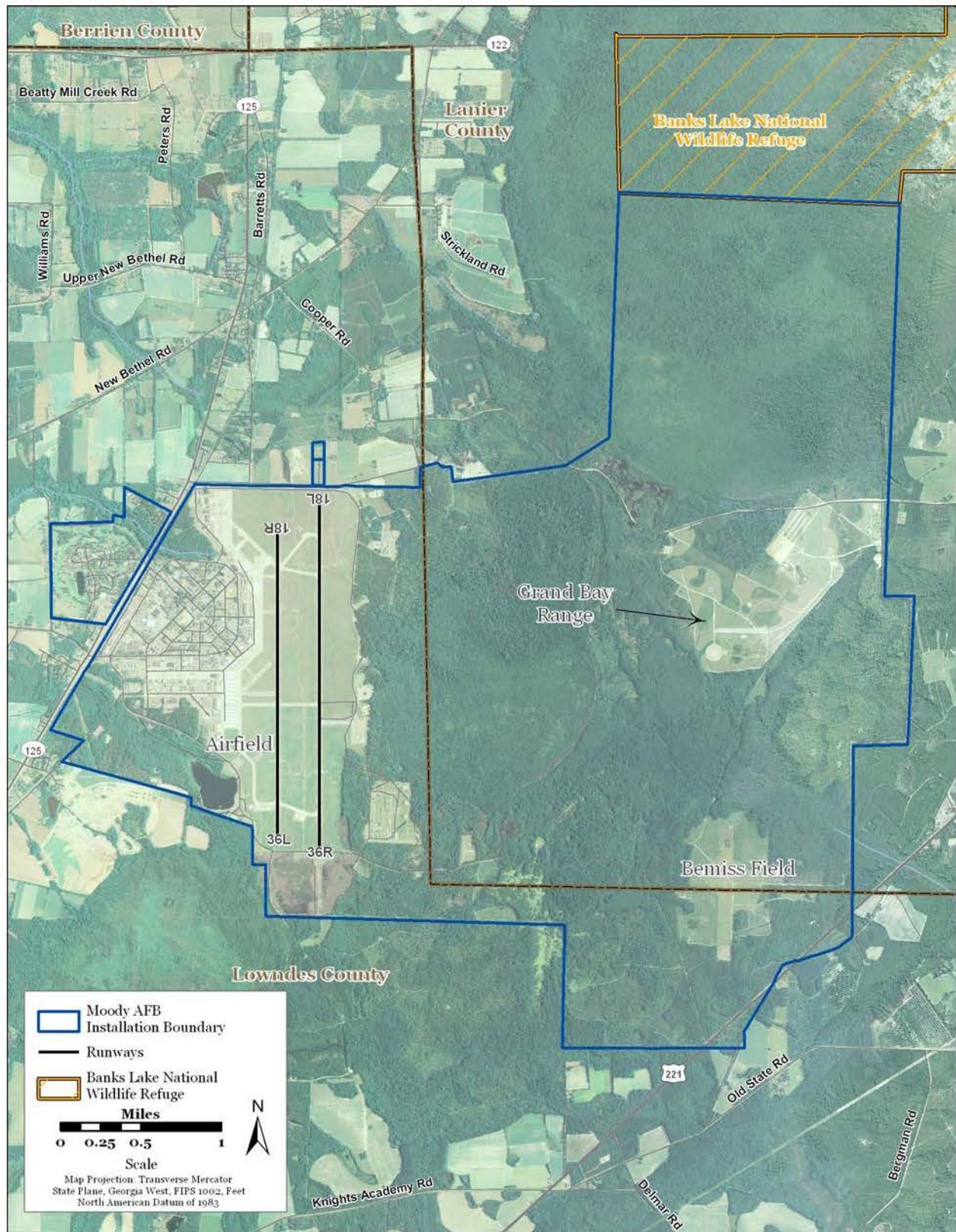


Figure 1-3. Moody AFB Installation Map

Table 1-1. Existing and Proposed Airspace Components and Bombing Ranges Used by Moody AFB Aircraft

Military Operations Areas (MOAs)	
Moody 1	Bulldog A
Moody 2 North	Bulldog B
Moody 2 South	Coastal 1 East
Moody 3	Coastal 1 West
Live Oak	
Restricted Areas	
Grand Bay Range	Townsend Range
LATN Area	

In 2002 the U.S. Navy received a Record of Decision (ROD) for an EIS evaluating sortie-operations and ordnance use at Pinecastle Range in Ocala, Florida. This 2002 EIS evaluated A-10 sorties and ordnance expenditures. Further discussion of Pinecastle Range is included in **Section 4**.

This EA addresses potential environmental consequences associated with the Proposed Action and reasonable alternatives. Details on the Proposed Action are presented in **Section 2**.

1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to increase training opportunities with the aircraft stationed at Moody AFB. Increases in sortie-operations and ordnance expenditures within existing military airspace and training ranges would enable Moody AFB airmen to complete required readiness training operations and ensure that mission capabilities are sustained.

The need for the Proposed Action is to increase aircraft operations and ordnance expenditures, over and above those analyzed in the 2006 *Base Realignment and Closure Commission (BRAC) Environmental Assessment, Moody Air Force Base, Georgia* (hereafter referred to as the “2006 BRAC EA”). The sortie-operation estimates for airspace areas and ranges usage by Moody AFB aircraft, as evaluated in the 2006 BRAC EA, are not at the level sufficient to meet current operational needs for the installation. At the time the 2006 BRAC EA was written, the A-10 aircraft were not stationed at Moody AFB. Once the 48 Primary Authorized Aircraft (PAA) arrived and began training, the actual number of training sorties was reassessed and the need to increase training at MOAs and ranges was identified. The 23 FG needs to conduct additional sorties with the A-10 aircraft stationed at Moody AFB to meet increased training requirements to ensure airmen are ready to deploy in support of current and future Overseas Contingency Operations. These requirements include increases in air-to-air training and air-to-ground weapons delivery. The proposed increase would support military readiness and provide realistic training to ensure aircrews are mission-trained, qualified, and prepared for deployment to support real-world events.

A-10 pilots need to train at a range with a tactical target in order to complete tactical training that is required as part of their Mission Qualification Training. The Mission Qualification Training program is a unit-developed plan that incorporates the profiles typical of squadrons to ensure pilots are prepared to accomplish the primary unit mission. Tactical training includes use of ordnance, threat simulators, countermeasures, and dissimilar aircraft to the maximum extent possible. In addition, the range proposed for use must be a “scoreable range,” or a range where the pilot’s weapons delivery can be scored.

Weapons delivery qualifications require A-10 pilots to complete air-to-surface weapons event requirements on scoreable tactical ranges to the maximum extent practical. At the end of the training cycle, each pilot's weapons delivery scores are reviewed to assess the pilot's qualification.

1.3 Summary of Key Environmental Compliance Requirements

1.3.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] Section 4321–4347) is a Federal statute requiring the identification and analysis of potential environmental impacts associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decisionmakers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) that was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA. The CEQ regulations mandate that all Federal agencies use a prescribed, structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decisionmaking process. This process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action.

1.3.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decisionmaking process for Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decisionmaker to have a comprehensive view of major environmental issues and requirements associated with a Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated “with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively.”

This EA will examine potential effects of the Proposed Action and alternatives on 11 resource categories:

- Geological resources
- Water resources
- Infrastructure
- Airspace management and flight safety
- Noise
- Land use
- Socioeconomic resources and environmental justice
- Cultural resources
- Air quality
- Biological resources
- Hazardous materials and wastes.

These resource categories were identified as being potentially affected by the Proposed Action and include applicable critical elements of the human environment whose review is mandated by Executive Order (EO), regulation, or policy.

Appendix B contains examples of relevant laws, regulations, and other requirements that are often considered part of the analysis. Only those laws, regulations, or other requirements relevant to resource categories analyzed in this EA are included in **Appendix B**.

1.4 Interagency Coordination and Public Involvement

The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning* (IICEP), requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements (i.e., to determine the scope of issues to be addressed in detail in the EA). Through the IICEP process, the USAF notifies relevant Federal, state, and local agencies of the Proposed Action and alternatives and provides them sufficient time to make known their environmental concerns specific to the Proposed Action. IICEP materials are included in **Appendix C**, which includes the list of recipients and a copy of the representative letter that was sent out.

NEPA requirements also help ensure that environmental information is made available to the public during the decisionmaking process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if Federal proponents of an action provide information to state and local governments and the public and involve them in the planning process. CEQ guidance in 40 CFR 1501.7 specifically states, “There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to proposed actions. This process shall be termed scoping.” The public involvement process augments the USAF opportunity to cooperate with and consider state and local views in implementing a Federal proposal.

Through the public involvement process, Moody AFB notified relevant Federal, state, and local agencies of the Proposed Action and request input regarding environmental concerns they might have regarding the Proposed Action. The public involvement process provides Moody AFB with the opportunity to cooperate with and consider state and local views in its decision regarding implementing this Federal proposal. As part of the process, Moody AFB coordinated with the Georgia Department of Natural Resources (GDNR) Environmental Protection Division (EPD); U.S. Fish and Wildlife Service (USFWS); Georgia and Florida State Historic Preservation Offices (SHPOs); and other Federal, state, and local agencies (see **Appendix C**). Input from agency responses was incorporated into the analysis of potential environmental impacts.

A Notice of Availability (NOA) for this EA and proposed FONSI was published in local newspapers. The published NOA solicits comments on the Proposed Action and is intended to involve the local community in the decisionmaking process. Comments received from the public and other Federal, state, and local agencies were addressed in the EA and included in **Appendix D**. **Appendix E** includes a list of counties underlying each of the airspace units and ranges evaluated in this EA. **Appendix F** contains a list of potential sensitive, threatened, and endangered species in the ROI.

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2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Detailed Description of the Proposed Action

The Proposed Action consists of the expansion of sortie-operations and flare use within existing airspace components and ranges and a corresponding weapons expenditure rate increase on existing ranges to ensure required mission readiness training requirements.

A sortie consists of a single military aircraft flight from initial takeoff through final landing. A sortie-operation is defined as the use of one airspace unit (e.g., a MOA, range, or Restricted Areas [R]) by one aircraft. Sortie-operations apply to flight activities outside the airfield airspace environs. Each time a single aircraft flies in a different airspace unit, one sortie-operation is counted for that unit. As an example, on a typical training mission at Moody AFB, an aircraft makes an initial takeoff and flies to a MOA (one sortie-operation at the MOA) to practice flight maneuvers, proceeds to a range to practice ordnance delivery (one sortie-operation at the range), and then returns to the airfield. This generates two sortie-operations.

The sortie-operation estimates for airspace areas and ranges usage by Moody AFB aircraft, as evaluated in the 2006 BRAC EA, are not at the level sufficient to meet current operational needs for the installation. Realistic training is required to ensure aircrews are mission-trained, qualified, and prepared for deployment to support real-world events, which include the tactical delivery of air-to-ground munitions, laser designation of targets from ground and airborne platforms, and threat evasion via techniques such as flare usage. These events would occur in existing airspace components and ranges and are necessary to meet the training requirements for Moody AFB airmen. There would be no personnel changes or construction activities as part of the Proposed Action.

All of the airspace components and ranges analyzed in this EA (see **Table 1-1**) are currently in existence; the creation of new airspace areas is not part of the Proposed Action. The airspace units and ranges analyzed in this EA are currently being used by Moody AFB airmen.

The 2006 BRAC EA (Moody AFB 2006) assessed a baseline and proposed number of annual sortie-operations and ordnance use for the airspace areas and ranges used by Moody AFB aircraft. The proposed scenario in the 2006 BRAC EA is the baseline scenario for this EA. Baseline and proposed annual sortie-operations assessed in this EA are shown in **Table 2-1**. Overall, approximately 10 percent of all sortie-operations under the baseline and 14 percent under the Proposed Action would be conducted at night (10 p.m. to 7 a.m.) (see **Appendix A**).

Baseline and proposed annual ordnance use are shown in **Table 2-2**. The Proposed Action does not include an increase in use of live ordnance; however, it does include an increase in the use of inert ordnance at Townsend range. Although there is an increase in sortie-operations at both Townsend Range and Grand Bay Range, the increase in ordnance and munitions at Grand Bay Range is being addressed in the *Grand Bay Range Operations Environmental Assessment*, which is currently in progress. Consequently, the increase in ordnance and munitions at Grand Bay Range is not analyzed in this EA.

Baseline and proposed annual flare use are shown in **Table 2-3**. The types of flares that would be used include LUU-2, LUU-19, and M-206.

A detailed description and map of each airspace component is included in **Appendix A**.

Airspace is defined as the space that lies above a nation and comes under its jurisdiction. Although it is generally viewed as being unlimited, airspace is a finite resource that can be defined vertically,

Table 2-1. Baseline and Proposed Annual Sortie-Operations

Airspace Unit	Baseline Use ^a					Projected Use				
	<i>A-10</i>	<i>HC-130</i>	<i>HH-60</i>	<i>Other</i>	<i>Total</i>	<i>A-10</i>	<i>HC-130</i>	<i>HH-60</i>	<i>Other</i>	<i>Total</i>
Moody 1 MOA	3,760	8	0	27	3,795	6,000	0	0	110	6,110
Percent Change	--	--	--	--	--	60%	-100%	--	307%	61%
Moody 2 North MOA	2,004	456	412	29	2,901	4,000	500	600	185	5,285
Percent Change	--	--	--	--	--	100%	10%	46%	538%	82%
Moody 2 South MOA	2,004	456	412	29	2,901	4,000	500	600	169	5,269
Percent Change	--	--	--	--	--	100%	10%	46%	483%	82%
Moody 3 MOA	1,962	0	0	421	2,383	1,840	0	0	572	2,412
Percent Change	--	--	--	--	--	-6%	--	--	36%	1%
Live Oak MOA	572	0	0	44	616	1,450	0	0	60	1,510
Percent Change	--	--	--	--	--	153%	--	--	36%	145%
Bulldog A MOA	312	0	0	2,075	2,387	500	0	0	2,075	2,575
Percent Change	--	--	--	--	--	60%	--	--	--	8%
Bulldog B MOA	168	0	0	1,785	1,953	500	0	0	1,785	2,285
Percent Change	--	--	--	--	--	198%	--	--	--	17%
Coastal 1 East MOA ^b	764	0	0	1,840	2,604	2,000	0	0	1,840	3,840
Percent Change	--	--	--	--	--	162%	--	--	--	47%
Coastal 1 West MOA ^b	764	0	0	1,840	2,604	2,000	0	0	1,840	3,840
Percent Change	--	--	--	--	--	162%	--	--	--	47%
Grand Bay Range (R-3008)	2,964	229	337	5	3,535	5,000	500	600	400	6,500
Percent Change	--	--	--	--	--	69%	118%	78%	7900%	84%
Townsend Range (R-3007)	764	0	0	4,000	4,764	2,000	0	0	4,000	6,000
Percent Change	--	--	--	--	--	162%	--	--	--	26%
LATN Area	5,000	575	1,140	0	6,715	5,000	600	1,200	0	6,800
Percent Change	--	--	--	--	--	--	4%	5%	--	1%
Total	21,038	1,724	2,301	12,095	37,158	34,290	2,100	3,000	13,036	52,426

Notes:

a. Source: Moody AFB 2006

b. Source: FAA 2008

Table 2-2. Baseline and Proposed Annual Ordnance Use at Townsend Range

Ordnance Type	<i>Baseline Use</i>	<i>Proposed Use</i>
BDU-33	8,600	10,600
Percent Change	--	23%
BDU-50/MK-82	641	691
Percent Change	--	8%
MK-83	93	93
Percent Change	--	--
BDU-56/MK-84	76	76
Percent Change	--	--
7.62-mm	145,000	145,000
Percent Change	--	--
20-mm	25,000	25,000
Percent Change	--	--
30-mm	83,500	283,500
Percent Change	--	240%
2.75-inch Rockets	388	1,388
Percent Change	--	258%
Total	263,298	466,348

Notes: Numbers of annual ordnance use are total range numbers and include non-Moody AFB aircraft usage.

Key:

BDU = bomb dummy unit

mm = millimeter

MK = mark

Table 2-3. Baseline and Proposed Annual Flare Use

Airspace Unit	Flare Use	
	<i>Baseline Use ^a</i>	<i>Proposed Use</i>
Moody 2 North MOA	0	5,000
Moody 2 South MOA	0	5,000
Total	0	10,000

a. Source: Lopez 2011a

horizontally and temporally when describing its use for aviation purposes. Under Public Law (P.L.) 85-725, the Federal Aviation Administration (FAA) is charged with the safe and efficient use of the nation's airspace and has therefore established certain criteria and limits for its use. In order to accomplish its task, the FAA uses the National Airspace System (NAS).

Part of the NAS includes Special Use Airspace (SUA). SUA consists of airspace where activities must be confined because of their nature, or where limitations are imposed upon aircraft operations that are not a

part of those activities, or both. Except for controlled firing areas, SUA areas are depicted on aeronautical charts. All SUA descriptions are contained in FAA Order 7400.8, Special Use Airspace (USDOT 2007).

Moody AFB aircraft currently use multiple MOAs. MOAs are areas that consist of airspace of defined limits established for the purpose of separating certain military training activities from instrument flight rules (IFR) traffic. FAA restricts IFR traffic in MOAs during scheduled training activities. However, there is no restriction against a pilot operating under visual flight rules (VFR) in these areas. Notice to Airmen (NOTAM) are used to identify the locations of MOAs so that aircraft operating under VFR are aware of military training activities. The MOAs surrounding Moody AFB (i.e., Moody 1, Moody 2 North, Moody 2 South, and Moody 3) are shown on **Figure 2-1**; MOAs east of Moody AFB in Georgia used by Moody AFB aircraft (i.e., Coastal 1 East, Coastal 1 West, Bulldog A, and Bulldog B) are shown on **Figure 2-2**; and Live Oak MOA in northern Florida is shown on **Figure 2-3**. The entry and exit routes for the MOAs would not change under the Proposed Action. These include entry and exit routes between the airfield to Moody MOA 2 that traverse east and west and routes where the aircraft fly north and south to the airfield.

Grand Bay Range and Townsend Range (see **Figures 2-1** and **2-2**) are within Restricted Areas. Part of Grand Bay Range (R-3008A) is within the Moody AFB installation boundary directly east of the airfield. Townsend Range (R-3007) is in eastern Georgia within the Coastal 1 East MOA. Restricted Areas contain airspace within which flight of participating aircraft, while not wholly prohibited, is subject to restrictions. Nonparticipating aircraft are not permitted in a Restricted Area when active. Restricted airspace is needed when there are hazardous military activities including live firing of weapons, ordnance delivery, or aircraft testing. R-3008 and R-3007 have specific hours of operation and users must have permission from the controlling agency before flying through the defined areas.

As depicted on the maps shown in **Appendix A**, there are multiple Restricted Areas above Grand Bay Range and Townsend Range. Restricted Areas above Grand Bay Range include R-3008A, R-3008B, R-3008C, and R-3008D. For the purposes of this EA, the entire complex is referred to as R-3008. Restricted Areas above Townsend Range include: R-3007A, R-3007B, R-3007C, and R-3007D. For the purposes of this EA, the entire complex is referred to as R-3007.

Bemiss Field, which is part of Grand Bay Range, is approximately 3 miles southeast of the Moody AFB airfield within Grand Bay Range (see **Figure 1-3**). Bemiss Field is a 95-acre reclaimed landing strip previously used during the 1940s as an auxiliary airstrip for Moody AFB. A 2008 EA evaluated an unimproved landing zone (ULZ) at Bemiss Field (Moody AFB 2008d). The previous asphalt cover was removed, the site was vegetated with grass and the surrounding area cleared of trees and obstructions. Bemiss Field is currently used for various military training activities, including combat survival and threat scenario training, and has a HH-60 landing zone and C-130 drop zone. A 2008 EA evaluated the beddown of a reserve Classic Associate Unit (CAU) for A-10 at Moody AFB. The number of A-10 sortie-operations increased for the proposed CAU reserve squadron. These increases for the reserve unit have been included in the baseline and proposed sortie scenarios presented in **Table 2-1**.

Airspace outside of a MOA can be used by military aircrews for low-speed and low-altitude training that is identified as a LATN area. A LATN area covers a large region of uncontrolled airspace and facilitates operational flexibility (e.g., the direction of flight is not restricted). LATN areas usually have an altitude structure between 100 and 1,500 feet above ground level (AGL) and airspeeds of less than 250 knots. At these speeds, military aircraft are capable of safely merging with civilian traffic. Military aircraft engaged in this type of training, like all other aircraft, are required to comply with Federal aviation regulations to see and avoid other aircraft and obstacles. The FAA does not consider a LATN area as a type of SUA; therefore, a formal airspace designation is not required and LATN areas are not shown on FAA charts or publications. As shown on **Figure 1-2**, the Moody LATN area encompasses more than

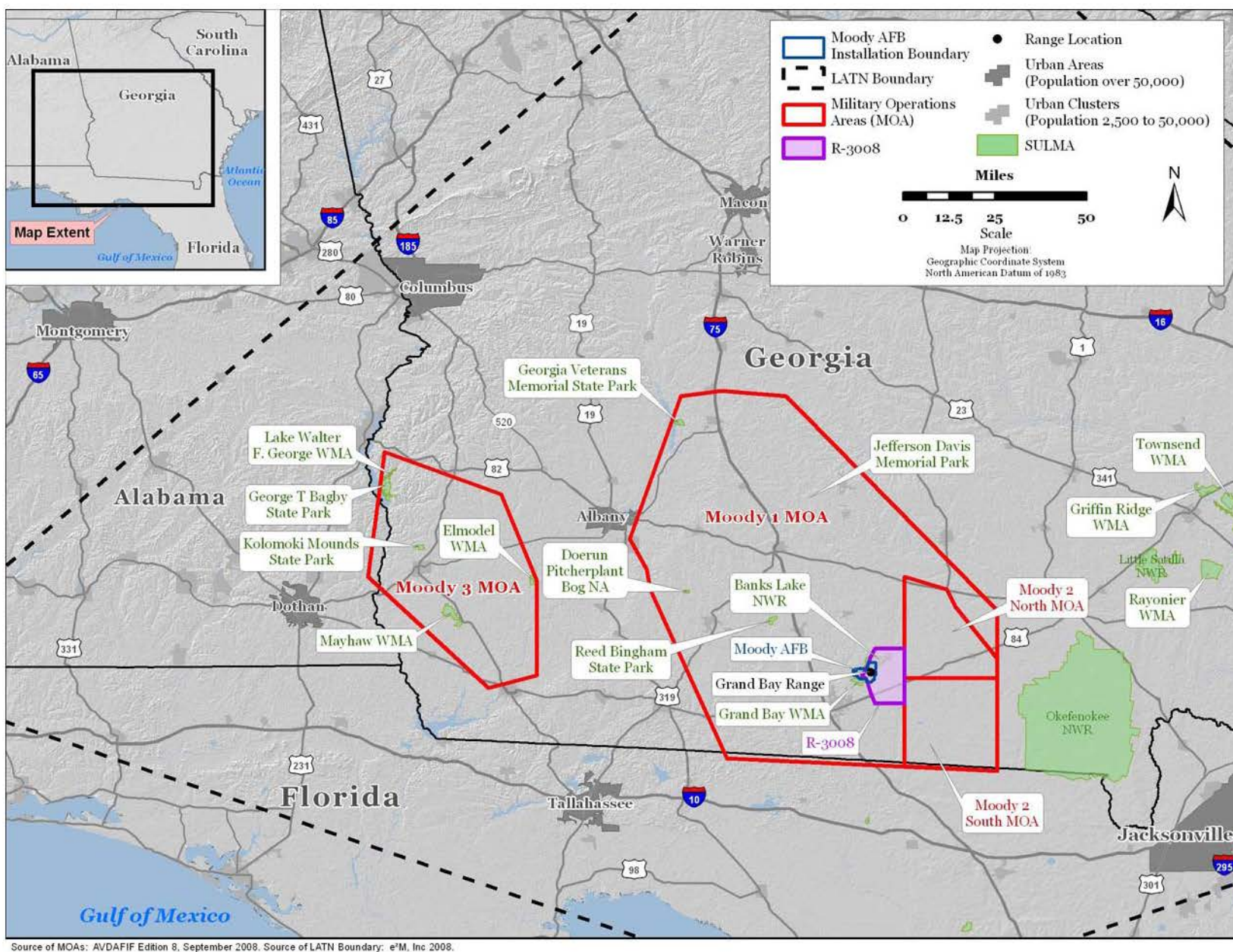
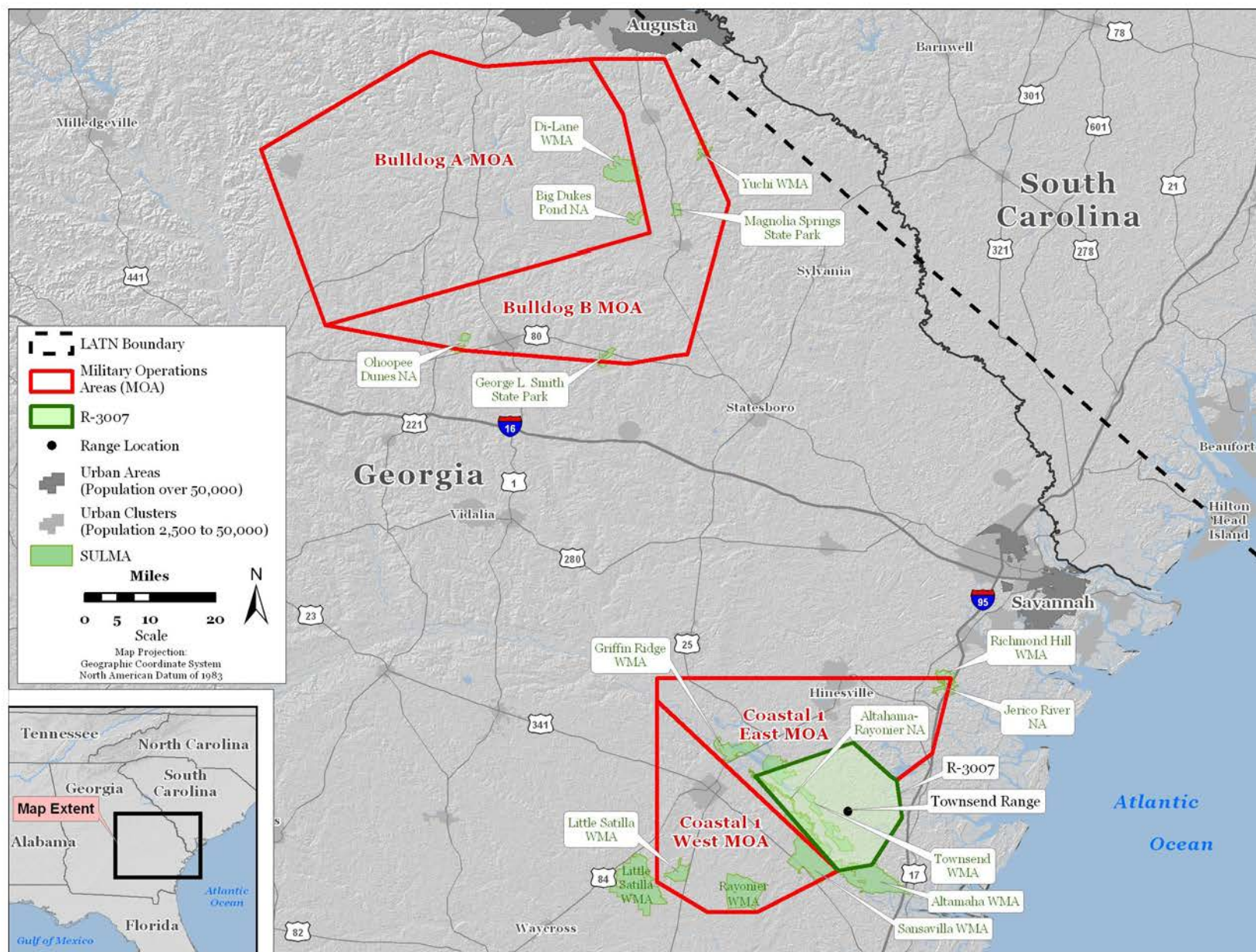
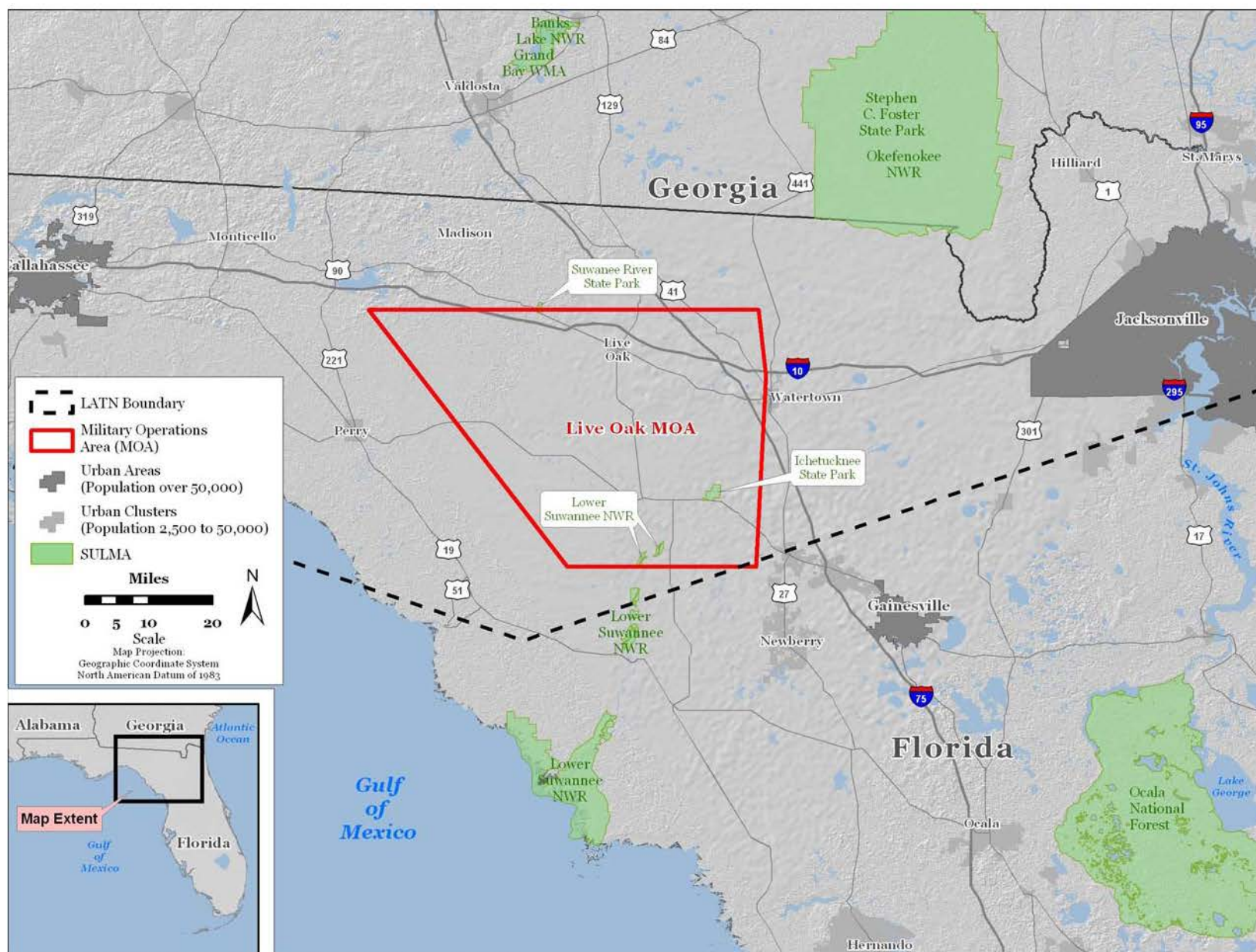


Figure 2-1. Assessed Airspace Components and Bombing Range Proximate to Moody AFB



Source of MOAs and RA-3007: AVDAFIF Edition 8, September 2008. Source of LATN Boundary: e*M, Inc 2008.

Figure 2-2. Assessed Airspace Components and Bombing Range in Georgia



Source of MOA and RA-2910: AVDAFIF Edition 8, September 2008. Source of LATN Boundary: e*IM, Inc 2008.

Figure 2-3. Assessed Airspace Components in Florida

85,000 square nautical miles (NM), covering a small amount of southern South Carolina, portions of southeastern Alabama, the majority of Georgia, and portions of northern Florida.

Under the Proposed Action, Moody AFB aircrews would use Townsend Range at increased utilization and ordnance use rates. Proposed gunnery training operations would include firing the number of rounds shown in **Table 2-2**. The proposed increase in sortie-operations would involve both day and night training activities along with some weekend flying (see **Appendix A**).

Chaff and flare use is also managed as ordnance. Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid successful attack by enemy air defense systems. Flares are ejected from aircraft to provide high-temperature heat sources that mislead heat-sensitive or heat-seeking targeting systems. Defensive flares are used to keep aircraft from being successfully targeted by weapons such as surface-to-air missiles, anti-aircraft artillery, or other aircraft (Moody AFB 2006). Flares burn for 3 to 4 seconds at a temperature in excess of 2,000 degrees Fahrenheit to simulate a jet exhaust. During the burn, a flare descends approximately 400 feet. The burning magnesium pellet is consumed, and four or five plastic pieces and aluminum-coated Mylar wrapping material falls to the ground (Moody AFB 2006).

Chaff and flares can be used as threat emitters when aircrews are training in MOAs. To achieve this, equipment is set up at various locations such as the side of roads, in cleared areas, or landing zones. The aircrews respond to the threats presented either with evasive maneuvers, by masking themselves below the tree line, or by ejecting chaff or flares through an aircraft warning system. Threat emitters can be engaged at any altitude within a MOA and will vary depending on the type of threat requested and the training.

A-10 pilots must train to employ defensive countermeasures such as chaff and flares. Effective use of chaff and flares in combat requires frequent training by aircrews to master the timing of deployment and the capabilities of the defensive countermeasure and by ground crews to ensure safe and efficient handling of chaff and flares (Moody AFB 2006). Under the Proposed Action, Moody AFB aircrews would use flares in the Moody 2 North and South MOAs. No changes in flare use would occur in the other MOAs or ranges; therefore, flare use is only analyzed in the Moody 2 North and South MOAs in this EA. As shown in **Table 2-3**, no flares are used at Moody 2 North and South MOAs under baseline conditions; the use of a total of 10,000 flares per year is proposed in this EA. Chaff expenditures would remain the same as those analyzed in the 2006 BRAC EA; therefore, chaff use is not analyzed in this EA.

Airspace areas analyzed in this EA consist of those designated to serve military aircraft operating to and from Moody AFB or transiting to the local area. Controlled airspace is designated around Moody AFB to support local airfield operations. Valdosta Radar Approach Control (RAPCON) at Moody AFB provides service to Moody AFB and 10 other airports in the region. Valdosta RAPCON is responsible for directing military aircraft passing from one SUA to another (including Grand Bay Range [R-3008], Moody 1, Moody 2 North, and Moody 2 South MOAs) within their controlling area and directing nonparticipating aircraft around, above, or beneath these SUA units. The FAA's Atlanta Air Route Traffic Control Center (ARTCC) is the controlling agency for the Bulldog A and Bulldog B MOAs; and the FAA's Jacksonville ARTCC is the controlling agency for Live Oak, Coastal 1 East, and Coastal 1 West MOAs, and the airspace (R-3007) associated with Townsend Range. A LATN area is not a formal airspace designation; therefore, the Moody LATN area does not have a controlling agency.

Moody air traffic control (ATC) tower is responsible only for aircraft within the Moody AFB Class D airspace. Class D airspace can generally be described as a controlled airspace that extends from the surface or a given altitude to a specified higher altitude. At Moody AFB, Class D airspace exists from the surface up to and including 2,700 feet above mean sea level (MSL) within a 5-NM radius of the

geographical center of Moody AFB. Class D airspace is designed to provide control into and out of primary airports that have an operational control tower and radar approach capabilities, and where aircraft operations are periodically at high-density levels. All aircraft operating within this airspace are required to maintain two-way radio communication with the ATC facilities. The Class D airspace surrounding Moody AFB also includes the eastern portion of R-3008. The western portion of R-3008 is Class E airspace, which can be described as generally controlled airspace.

2.2 Alternatives to the Proposed Action

2.2.1 Introduction

Under NEPA, reasonable alternatives to the Proposed Action must be considered in an EA. Considering alternatives helps to avoid unnecessary impacts and allows an analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must be suitable for decisionmaking (i.e., any necessary preceding events have taken place), capable of implementation, and satisfactory with respect to meeting the purpose of and the need for the action. The development of alternative training scenarios was based on Moody AFB's need to establish and sustain a military training environment that is adequate to meet proficiency training requirements of Moody AFB. This process involved analysis of operational needs and requirements for training activities. The following selection standards were used to assess reasonable alternatives:

- Located within 150 NM of Moody AFB to allow for efficient transit time to maximize training time without refueling
- Sufficient availability to meet training requirements in a timely and routine manner including the availability of training during nighttime hours
- Compatibility with the Host's Master Plan and military mission
- Range would have a tactical target to complete the tactical training that is required as part of their Mission Qualification Training
- Range would be scoreable so that each pilot's weapons delivery could be reviewed to assess the pilot's qualification.

Moody AFB airmen train as close to their installation as possible. This saves fuel and allows the airmen to maximize their training time in the air. For example, the Bulldog MOAs are approximately 125 NM from Moody AFB. In order for the airmen to train at the Bulldog MOAs, they must have at least 2 hours to fly to the MOA, train, and then fly back to Moody AFB. If however, the airmen are training in Moody 1 or Moody 2 MOAs, they could arrive at those MOAs within a few minutes after leaving the installation. This gives the airmen more time to train and less time in transit. Consequently, training time is scheduled close to the installation when possible. As shown in **Table 2-1**, the majority of the sortie-operations, and the largest increases in sortie-operations, are shown in the Moody MOAs. The smallest number and the smallest increase in sortie-operations are shown in MOAs that are farther away from the installation, such as the Bulldog MOAs.

The following discussion identifies alternatives considered by the USAF and identifies whether they are reasonable and, hence, subject to detailed evaluation in this EA. The evaluated alternatives to the Proposed Action (see **Sections 2.2.2 through 2.2.4**) did not meet the selection standards listed above and therefore were eliminated from further detailed analysis in this EA.

2.2.2 Avon Park Alternative

Avon Park Range is home to a unit of the 23 WG at Moody AFB. However, the distance to fly to Avon Park Range is outside of the preferred 150-NM range. As previously discussed, airmen generally prefer to train as close to Moody AFB as possible so they can spend more time training and less time flying to and from the training area; therefore, the Avon Park Alternative is not carried forward for further detailed analysis in this EA.

2.2.3 Tyndall AFB MOA and Warning Area W-470 Alternative

Tyndall MOAs and Warning Area (W-470) are southeast of Moody AFB within the 150-NM range. Airspace within these MOAs and Warning Area are used predominantly by the airmen from Tyndall AFB. However, airmen from adjacent installations also use these training areas (such as Eglin AFB and Naval Air Station Pensacola). As a result, this alternative was eliminated because of conflicts over use of the airspace with users who have higher priority status. In addition, this airspace is closer to noise-sensitive locations such as public beaches and recreation areas; therefore, this alternative is not carried forward for further detailed analysis in this EA.

2.2.4 Range Alternatives

For a range to be considered viable for training by Moody AFB airmen, it needs to be a range where tactical training can be completed, within 150-NM of the installation, and it needs to be scoreable. If it is not a scoreable range, then a pilot's weapons delivery cannot be reviewed to assess the pilot's qualification. Therefore, Poinsett Range was eliminated because it is outside of the 150-NM distance. Fort Stewart is within the required distance but is not a scoreable range. Scoreable ranges within 150 NM of Moody AFB include Townsend Range and Grand Bay Range. Moody AFB airmen are currently using Townsend Range; therefore, it is a viable location for range training activities. However, because Moody AFB owns and operates Grand Bay Range, directly adjacent to Moody AFB, training within Grand Bay is preferred. Since Grand Bay Range is the preferred location, the majority of training from Moody AFB airmen is conducted there. However, Grand Bay Range cannot support all the required training sorties; consequently, Townsend Range is utilized as well.

2.2.5 Reduce Training Requirement Alternative

Regulations require USAF military flying units to maintain specified high standards through readiness training so they are able to respond to mission requirements when called upon to do so. Reducing training requirements would limit the USAF's ability to defend national security interests. Therefore, this alternative is not a viable option and is not carried forward for further detailed analysis in this EA.

2.2.6 Replace Flight Training with Simulator Training Alternative

Simulator training is a valuable training tool for preliminary training activity, especially during initial aircrew qualification training. Simulators are also used for continuation training for various procedures, including emergency training and instrument refresher courses. However, the dynamics of weather, the three-dimensional environment in flight, G-forces, and many other flight conditions can only be experienced in actual flight. Therefore, this alternative is not considered a viable alternative to the Proposed Action and is not carried forward for further detailed analysis in this EA.

2.2.7 No Action Alternative

This alternative refers to the continuation of the existing conditions for the affected environment in airspace areas used by Moody AFB aircraft without implementation of the Proposed Action as the No Action Alternative. CEQ regulations require consideration of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated.

Under the No Action Alternative, the Proposed Action would not be implemented. The number of annual sortie-operations and the corresponding weapons expenditure rates would not increase for Moody AFB aircrews, resulting in reduced training time and a potential increase in operating costs as ranges further from Moody AFB would have to be used to accomplish required training actions. The No Action Alternative is carried forward for further detailed analysis in this EA.

The preferred alternative is the Proposed Action, as described in **Section 2.1**.

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3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section presents the characteristics of the affected environment and an analysis of the potential direct and indirect effects each alternative would have on the affected environment. Cumulative and other effects are discussed in **Section 4**. All potentially relevant resource areas were initially considered for analysis in this EA. Some were eliminated from detailed examination because of their inapplicability to the Proposed Action. General descriptions of the eliminated resources and the basis for their elimination are described in **Section 3.1**.

The Region of Influence (ROI) for this EA includes the military airspace and ranges currently used and proposed to be used by Moody AFB aircraft and the land areas directly underneath these areas. As shown in **Table 2-1**, the airspace analyzed in this EA includes nine MOAs, and one LATN area along with two ranges. These airspace areas and ranges are illustrated in **Figure 1-2**. Additional details of each of these airspace areas and ranges are provided in **Appendix A**.

The following discussion elaborates on the nature of the characteristics that might relate to resources.

Short-term or long-term. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic.

Direct or indirect. A direct effect is caused by and occurs contemporaneously at or near the location of the action. An indirect effect is caused by a proposed action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct effect of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.

Negligible, minor, moderate, or major. These relative terms are used to characterize the magnitude or intensity of an impact. Negligible effects are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate effect is readily apparent. A major effect is one that is severely adverse or exceptionally beneficial.

Adverse or beneficial. An adverse effect is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment. A single act might result in adverse effects on one environmental resource and beneficial effects on another resource.

Significance. Significant effects are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27).

Context. The context of an effect can be localized or more widespread (e.g., regional).

Intensity. The intensity of an effect is determined through consideration of several factors, including whether an alternative might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Effects are also considered in terms of their potential for violation of Federal, state, or local environmental law; their controversial nature; the degree of uncertainty or unknown effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative effects (see **Section 4**).

3.1 Preliminary Impact Assessment Exclusions

In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, the following evaluation of environmental impacts focuses on those resources and conditions potentially subject to effects and on potentially significant environmental issues deserving of study, and deemphasizes insignificant issues. Some environmental resources and conditions that are often analyzed in an EA have been omitted from detailed analysis. The following provides the basis for such exclusions.

3.1.1 Geological Resources

The Proposed Action would not require construction of any facilities at Moody AFB or any of the bombing ranges. Although the Proposed Action includes use of bombing ranges, land at the ranges has been heavily disturbed from previous range activities; therefore, it is unlikely that range activities would have the potential to significantly affect geological resources. Consequently, this EA does not provide a detailed examination of geological resources.

3.1.2 Water Resources

The Proposed Action would not require construction of any facilities at Moody AFB or any of the bombing ranges. Although the Proposed Action includes use of bombing ranges, land at the ranges has been heavily disturbed from previous range activities; therefore, it is unlikely that range activities would have the potential to significantly affect water resources. Consequently, this EA does not provide a detailed examination of water resources.

3.1.3 Infrastructure

The Proposed Action would not be located in any utility corridors, and would not impact utilities or similar infrastructure. Under the Proposed Action, there would not be a change in the number of personnel assigned to Moody AFB. Therefore, this EA does not provide a detailed examination of impacts on infrastructure.

3.2 Airspace Management and Flight Safety

3.2.1 Definition of the Resource

Airspace is defined as the space that lies above a nation and comes under its jurisdiction. Although it is generally viewed as being unlimited, airspace is a finite resource that can be defined vertically, horizontally, and temporally when describing its use for aviation purposes.

Airspace management procedures assist in preventing potential conflicts or aircraft accidents associated with aircraft using designated airspace in the United States, including restricted military airspace. Airspace management is facilitated through the use of specifically identified airspace defined vertically and horizontally in physical terms and also by duration of use. Such airspace demarcations are shown on aeronautical maps used by pilots for navigation.

Airspace management and flight safety are interrelated topics for the Proposed Action. Airspace management addresses how and in what airspace aircraft fly. This section of the EA addresses the rules, regulations, and procedures necessary to permit aircraft to operate safely among all other aircraft in the NAS. Flight safety evaluation criteria include airspace operations and traffic management, and procedures to minimize potential damage to aircraft systems.

Airspace Management

Airspace management is defined as the coordination, integration, and regulation of the use of airspace. The FAA has overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and ATC procedures. All military and civilian aircraft are subject to Federal Aviation Regulations (FARs). The FAA has acknowledged the need for military aircraft to conduct certain training operations within airspace that is separated from other types of civilian and commercial aircraft and sets aside such airspace for military use.

Training requirements for the military that involve the use of military airspace are specified in regulations written by their host commands. These requirements include training in air-to-air combat and air-to-ground weapons delivery. Some of the training activities that would occur in the MOAs or in the ranges would include the following:

- ***Aircraft Handling Characteristics.*** Pilots practice basic aircraft-handling skills to include basic and tactical formation maneuvering, traffic pattern stall recoveries, slow flight, turn rate and radius exercise, dive recovery exercise, and vertical maneuvering.
- ***Basic Fighter Maneuvers.*** Pilots practice defense against an adversary to include threat detection and reaction, and turning room exercises.
- ***Air Combat Maneuvers.*** Pilots practice defense with two aircraft against a single adversary to include training such as threat detection exercises, visual search procedures, and low altitude exercises.
- ***Tactical Weapons Delivery.*** Pilots practice multiple attack headings with various aircraft profiles and changes in the appearance of the target.
- ***Surface Attack Tactics.*** Pilots practice defense countermeasures, timing to the target, ordnance training on approved ranges, and tactical formations.

The FAA establishes rules of flight and ATC procedures to govern safe operations within each type of designated airspace. Military operations are generally conducted within designated airspace and follow specific procedures to maximize flight safety for nonparticipating civil or military aircraft.

The FAA regulates military operations through the implementation of FAA Handbook 7400.2H, *Procedures for Handling Airspace Matters*, and FAA Handbook 7610.4J, *Special Military Operations*. The latter was jointly developed by the Department of Defense (DOD) and FAA to establish policy, criteria, and specific procedures for ATC planning, coordination, and services during defense activities and special military operations. AFI 13-201, *U.S. Air Force Airspace Management*, indicates that military training requirements be completed through the safe and efficient use of available navigable airspace in a peacetime environment, while minimizing the impact on other aviation users and the public.

Scheduling is an important factor in airspace management and ATC. The affected airspace environment is described in terms of its principal attributes, namely controlled and uncontrolled airspace, SUA, military training routes, en route airways, airports and airfields, and ATC. As discussed in **Section 3**, the ROI includes the military airspace analyzed in this EA (see **Table 2-1**) and the land areas directly underneath that airspace.

There are two categories of airspace areas: regulatory (i.e., Classes A, B, C, D, and E airspace areas; restricted areas; and prohibited areas) and nonregulatory (MOAs, warning areas, alert areas, and controlled firing areas). These two categories are further divided into four classifications: controlled,

uncontrolled, SUA, and airspace for special use. The categories and types of airspace are dictated by the following:

- The complexity or density of aircraft movement
- The nature of the operations conducted within the airspace
- The level of safety required
- National and public interest in the airspace.

ATC procedures provide for aircraft to be flown under IFR and VFR conditions. VFR air traffic flies below 18,000 feet above MSL using visual references such as towns, highways, and railroads as a means of navigation. VFR conditions rely heavily on “see-and-avoid” procedures that require pilots to be visually alert for and maintain safe distances from other aircraft, populated areas, obstacles, or clouds. Most other air traffic (including air passenger commercial carriers, business aircraft, and military aircraft) operate under IFR conditions that require pilots to be trained and appropriately certified in instrument navigational procedures. The respective procedures established under VFR and IFR for airspace use and flight operations help segregate aircraft operating under each set of rules. Military pilots are trained for and use both VFR and IFR conditions.

Controlled airspace is a generic term that encompasses the different classifications (Classes A, B, C, D, and E) of airspace. All military and civilian aircraft are subject to FARs. Uncontrolled airspace (Class G) is not subject to restrictions that apply to controlled airspace. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. The primary users include general aviation aircraft.

Special Use Airspace. SUA consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. The FAA designates SUA for certain military training activities; one such airspace type is the Restricted Area. A Restricted Area is an airspace within which the flight of nonparticipating aircraft, while not wholly prohibited, is subject to restriction. Restricted Areas are designated when necessary to confine or segregate activities considered hazardous to nonparticipating aircraft. The Restricted Areas currently used by Moody AFB airmen include R-3008, associated with Grand Bay Range (see **Figures 1-3** and **2-1**) and R-3007, associated with Townsend Range (see **Figure 2-2**).

Another type of SUA designated for military training activities are MOAs. MOAs are areas that consist of airspace of defined vertical and lateral limits established for the purpose of separating certain military training activities from IFR traffic. There is no restriction against a pilot operating under VFR in these areas; however, a pilot should be alert since training activities could include certain military activities such as air combat maneuvers, air intercepts, and acrobatics (USDOT 2007). Moody AFB airmen currently use nine MOAs: Moody 1, Moody 2 North, Moody 2 South, Moody 3, Live Oak, Bulldog A, Bulldog B, Coastal 1 East, and Coastal 1 West (see **Figure 1-2**).

LATN Area. Airspace outside of a MOA can be used by military aircrews for low-speed and low-altitude training that is identified as a LATN area. A LATN area covers a large region of uncontrolled airspace and facilitates operational flexibility (e.g., the direction of flight is not restricted). LATN areas usually have an altitude structure between 100 and 1,500 feet AGL and airspeeds of less than 250 knots. At these speeds, military aircraft are capable of safely merging with civilian traffic. Military aircraft engaged in this type of training, like all other aircraft, are required to see and avoid other aircraft and obstacles. The FAA does not consider a LATN area as a type of SUA; therefore, a formal airspace designation is not required. As shown on **Figure 1-2**, the Moody LATN area encompasses more than 85,000 square NMs, covering a small amount of southern South Carolina, portions of southeastern Alabama, the majority of Georgia, and portions of northern Florida.

Flight Safety

Flight safety is based on the physical risks associated with aircraft flight and current military operation procedures concerning aircraft safety. A mishap is an unplanned occurrence that results in damage or injury. Historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews, including Moody AFB airmen and other users of the airspace within the ROI. Since the inception of the USAF in 1947, aircraft accidents have steadily declined each year.

The USAF has defined five classifications of aircraft mishaps: Classes A, B, C, D, and E (USAF 2008). Class A mishaps result in a total cost in excess of \$1 million, a fatality or permanent total disability, or destruction or damage beyond economical repair to USAF aircraft. Class B mishaps result in a direct mishap cost totaling \$200,000 or more (but less than \$1 million), a permanent partial disability, or inpatient hospitalization of three or more personnel. This does not include individuals hospitalized for observation, diagnostic, or administrative purposes that were treated and released. A Class C mishaps result in total damage that costs in excess of \$20,000 (but less than \$200,000), or any injury or occupational illness that causes loss of one or more days away from work beyond the day or shift it occurred (called Lost Time). Class D mishaps result in any nonfatal injury or occupational illness that does not meet the definition of Lost Time provided in AFI 91-204, *Safety Investigations and Reports* (USAF 2008). Class E mishaps are those occurrences that do not meet reportable mishap classification criteria, but are deemed important to report for mishap prevention. Class E reports provide an expeditious way to disseminate valuable mishap prevention information. AFI 91-204 stipulates that a Bird/Wildlife Aircraft Strike Hazard (BASH) event is any wildlife strike to an aircraft that does meet Class A, B, or C mishap reporting criteria (USAF 2008).

Obstructions to flights, which include towers and power transmission lines, represent safety concerns for aircrews, especially those engaged in low-altitude flight training. Hazardous weather conditions can pose safety hazards and influence a pilot to alter flight. Pilots consult the National Weather Service or weather services at local airports to obtain preflight weather information. Adverse weather conditions of concern include tornadoes, thunderstorms, hail, severe turbulence, dust storms, and wind shear. The evaluation of potential hazards of weather conditions rests in a pilot's sound discretion based on knowledge of available information, experience, and the operational limits of the aircraft. Therefore, weather-related safety issues are not carried forward for further analysis in this EA.

All military aircraft fly in accordance with FAR Part 91, *General Operating and Flight Rules*, which governs such things as operating near other aircraft, right-of-way rules, aircraft speed, and minimum safe altitudes when flying outside SUA. This regulation has precise requirements for the use of airports, heliports, and other landing areas; local flying rules; and SUA. For example, an installation commander having USAF aircraft assigned to, attached to, or tenant their command must prepare and publish local flying rules. These rules include the use of tactical training and maintenance test flight areas, arrival and departure routes, and airspace restrictions as appropriate to help control air operations. Altitudes for aircraft using SUA are set to ensure the safest operating environment. Installation commanders may set different altitudes based on noise abatement, fly neighborly policies, or other safety considerations.

AFI 91-202, *The USAF Mishap Prevention Program*, implements Air Force Policy Directive 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including BASH), assigns responsibilities for program elements, and contains program management information. The USAF devotes considerable attention to avoiding the possibility of bird/wildlife aircraft strikes. It has conducted

a worldwide program for decades to study bird migrations, bird flight patterns, and past strikes to develop predictions of where and when bird/wildlife aircraft strikes might occur so as to avoid such incidents.

Bird and wildlife strikes are a flight safety concern due to the potential damage that a strike might have on the aircraft or injury to aircrews. From 1985 to 2010, the Air Force Safety Center documented 90,912 wildlife strikes (AFSC 2010a). Of these, 44 resulted in Class A mishaps where the aircraft was destroyed, and 35 fatalities were recorded (AFSC 2010b). Therefore, 0.05 percent of all USAF wildlife strikes from 1985 to 2010 resulted in Class A mishaps.

Birds can be encountered at altitudes of up to 30,000 feet and higher. However, strike rates rise substantially as altitude decreases. More than 70 percent of USAF-recorded bird strikes occurred below 1,000 feet AGL and 99 percent occurred below 5,000 feet AGL (AFSC 2010c). Approximately half of these recorded bird strikes occurred in the airport environment and about one-third of these recorded strikes occurred during low-altitude training. During takeoff and landing, aircraft also face collision dangers from other types of wildlife, such as deer.

Nighttime flying operations are a safety concern due to decreased visibility; however, the same safe flying procedures, adherence to flight rules, and knowledge of emergency procedures that form consistent and repeated aspects of training for all aircrews, including Moody AFB airmen and other users of the airspace within the ROI, also apply to nighttime flying operations. FAR Part 91 states that an aircraft cannot be operated from sunset to sunrise unless it has lighted position, aviation, and landing lights.

Another flight safety concern is the use of ordnance or munitions associated with training activities. Ordnance use is conducted in accordance with AFI 13-212, *Range Planning and Operations* (USAF 2007a). AFI 13-212 provides the responsibilities of the Range Operation Authority (ROA), which include the publishing of a local range supplement to the AFI. The local range supplement must include the operational procedures for the range (e.g., the general range description, target and weapons authorizations and restrictions, and safety and emergency procedures). Flare use is also managed as ordnance. Flare use is conducted in accordance with AFI 11-214, *Air Operations Rules and Procedures*, which establishes safety procedures and altitude restrictions (USAF 2005).

3.2.2 Description of the Affected Environment

Airspace Management

The locations of the airspace analyzed in this EA were shown on **Figure 1-2**. As shown, many of the airspace areas overlap. **Table 2-1** provides the number of annual sortie-operations assessed for each airspace area analyzed in this EA. The baseline number of annual sortie-operations totals 37,158. A sortie consists of a single military aircraft flight from initial takeoff through final landing. As previously described, a sortie-operation is defined as the use of one airspace unit (e.g., a MOA, range, or Restricted Area) by one aircraft. Sortie-operations apply to flight activities outside the airfield airspace environs. Each time a single aircraft flies in a different airspace unit, one sortie-operation is counted for that unit. As an example, on a typical training mission at Moody AFB, an aircraft makes an initial takeoff and flies to a MOA (one sortie-operation at the MOA) to practice flight maneuvers, proceeds to a range to practice ordnance delivery (one sortie-operation at the range), and then returns to the airfield. This generates two sortie-operations.

MOAs. Nine MOAs (i.e., Moody 1, Moody 2 North, Moody 2 South, Moody 3, Live Oak, Bulldog A, Bulldog B, Coastal 1 East, and Coastal 1 West) are used by Moody AFB airmen to complete required mission-readiness training. The altitudes of these MOAs are shown in **Appendix A**.

Restricted Areas. Two Restricted Areas are currently used by Moody AFB airmen: R-3008, associated with Grand Bay Range (see **Figure 2-1**); and R-3007, associated with Townsend Range (see **Figure 2-2**). The airspaces associated with Grand Bay Range and Townsend Range are composed of multiple Restricted Areas. Grand Bay Range is a complex of four Restricted Areas (i.e., R-3008A, R-3008B, R-3008C, and R-3008D). For the purposes of this EA, the entire complex is referred to as Grand Bay Range (i.e., R-3008). Townsend Range is a complex of four Restricted Areas (i.e., R-3007A, R-3007B, R-3007C, and R-3007D). For the purposes of this EA, the entire complex is referred to as Townsend Range (i.e., R-3007).

LATN Area. As shown on **Figure 1-2**, the Moody LATN area encompasses more than 85,000 square NMs, covering a small amount of southern South Carolina, portions of southeastern Alabama, the majority of Georgia, and portions of northern Florida. A LATN area is not a formal airspace designation, therefore the Moody LATN area does not have a controlling agency.

Airspace and Range Scheduling. Valdosta RAPCON is responsible for directing military aircraft passing from one SUA to another within their controlling area, which includes R-3008; and Moody 1, Moody 2 North, and Moody 2 South MOAs. They also direct nonparticipating aircraft around these SUA units. Moody AFB does not currently have any scheduling issues with their airspace and has determined that excess capacity is available. As shown in **Table 3-1**, the percentage of airspace available at Moody 1, Moody 2 North and South, Moody 3, and Live Oak MOAs is between 84 and 99 percent. The primary run-in headings into Grand Bay Range are from the north and south.

Table 3-1. Capacity at Moody AFB Airspace and Live Oak MOA

Airspace Unit	Annual Hours Available for Use	Used Hours	Unused Hours	Available Airspace
Moody 1 MOA	8,760	36	8,724	99.4%
Moody 2 North MOA	8,760	1,070	7,690	87.7%
Moody 2 South MOA	8,760	1,332	7,428	84.7%
Moody 3 MOA	8,760	1,205	7,555	86.3%
Live Oak MOA	8,760	41	8,719	99.5%

The FAA Jacksonville ARTCC is the controlling agency for Live Oak, Coastal 1 East, and Coastal 1 West MOAs; and R-3007. Townsend Range does not currently have any scheduling issues with their airspace. If civilian aircraft need to transition through R-3007, the FAA Jacksonville ARTCC contacts Townsend Range. Townsend Range personnel then instruct the military aircraft in the airspace to move to allow the civilian aircraft to transition through the airspace. This occurs approximately one to two times a day (West 2009). The primary run-in headings for the target area of Townsend Range are south-southwest (West 2009).

The FAA Atlanta ARTCC is the controlling agency for Bulldog A and Bulldog B MOAs. Since the airspace analyzed in this EA is currently in existence, civilian aviation pilots are familiar with the procedures regarding flight through these areas. The floor of most of the MOAs analyzed in this EA is 8,000 feet above MSL or higher; therefore, the majority of the approaches to the local airports underneath the airspace are not affected by the existence of the MOAs. Aircraft departing from local airports underneath a MOA are held under the airspace or are given a revised route in order to receive clearance to their requested altitude.

Flight Safety

Flight safety associated with the airspace analyzed in this EA includes the following five key concerns:

1. Aircraft mishaps.
2. Exclusion areas in the Coastal 1 East, Coastal 1 West, and Bulldog A MOAs; and Grand Bay Range.
3. BASH issues.
4. Nighttime flying.
5. Ordnance use.

Mishaps. Safety investigations, mishap reporting procedures and responses, and mishap prevention program requirements are provided in AFI 91-204 and AFI 91-202 (USAF 2008 and USAF 1998). Each unit that conducts or supports flight operations must have a flight safety program to support its mission (USAF 1998). For example, safety and emergency procedures for Moody AFB are contained in Moody AFB Instruction 11-250, *Aircrew Operational Procedures/Air Traffic Control/Airfield Management* (Moody AFB 2008a). Moody AFB has highly trained emergency response teams, which are available to respond to aircraft crashes off site when normal, scheduled flying is in progress. Moody AFB also has mutual agreements with local fire departments should a mishap occur. The installation conducts regular aircraft mishap training exercises (Moody AFB 2006). However, Moody AFB equipment and personnel would respond to aircraft mishaps in the vicinity of Moody AFB only, not in the entire ROI. The commander of the USAF installation closest to the mishap would be responsible for responding to it (USAF 2008).

The number of USAF-wide Class A mishaps, the Class A mishap rate per 100,000 flying hours, and the annual flying hours for each of the three Moody AFB-based aircraft (A-10, C-130, and H-60) is provided in **Table 3-2**. As shown, approximately one Class A mishap per year has occurred for the three aircraft types assigned to Moody AFB (AFSC 2010d). In FY 2011, there was one Class A mishap at Moody AFB, which occurred with an A-10 aircraft.

Exclusion Areas. Four of the airspace areas analyzed in this EA contain exclusion areas, which include the following (see **Appendix A**):

1. The 3-NM exclusion area around Liberty County Airport, Georgia, in Coastal 1 East MOA.
2. The 3-NM exclusion area around Jesup-Wayne County Airport, Georgia, in Coastal 1 West MOA.
3. The 1-NM exclusion area around the City of Lakeland, Georgia, in the airspace associated with Grand Bay Range (R-3008C).
4. The 3-NM exclusion area around Louisville Municipal Airport, Georgia; the exclusion area around the cities of Stapleton and Wrens, Georgia; and the exclusion area around the cities of Sandersville and Tennille, Georgia, in Bulldog A MOA.

The local airport exclusion areas were developed for safety reasons. Military aircraft must fly 1,500 feet AGL or higher to avoid arrivals and departures into the local airports (USDOT 2007) and to prevent military aircraft from overflying noise-sensitive areas. The exclusion areas also require general aviation aircraft to stay below 1,500 feet AGL so that they don't come into contact with military aircraft using the MOAs. Some of the exclusion areas in the ROI prevent military aircraft from flying below 1,500 feet AGL in the cities of Lakeland, Stapleton, Wrens, Sandersville, and Tennille in Georgia.

Table 3-2. USAF Class A Mishap Data for the A-10, C-130, and HH-60 Aircraft

Fiscal Year (FY)	Number of Class A Mishaps	Class A Mishap Rate per 100,000 Flying Hours	Annual Flying Hours
A-10 Aircraft			
FY 2007	0	0.00	108,329
FY 2008	1	1.00	99,990
FY 2009	1	1.08	92,717
FY 2010	1	1.03	97,444
10-year average (2000–2010)	1.1	1.01	109,401
C-130 Aircraft			
FY 2007	0	0.00	268,546
FY 2008	1	0.39	256,607
FY 2009	0	0.00	243,421
FY 2010	0	0.00	252,046
10-year average (2000–2010)	0.9	0.32	285,146
H-60 Helicopter			
FY 2007	0	0.00	25,683
FY 2008	2	7.87	25,412
FY 2009	1	4.03	24,818
FY 2010	0	0.00	29,328
10-year average (2000–2010)	1.2	4.58	26,216

Source: AFSC 2010d

Note: Annual flying hours are rounded.

BASH. There is always a possibility of bird and wildlife strikes whenever aircraft operate, especially when operating in close proximity to the ground. BASH issues for the ROI as they relate to biological resources are discussed in **Section 3.8**.

The *Expanded BASH Program for Moody AFB and Private and Public Lands Surrounding Moody AFB, Georgia* was implemented to reduce risks to pilots and aircraft from BASH. This program applies to private and public lands within a 5-mile radius of Moody AFB (Moody AFB 2003). This radius covers Grand Bay Range and portions of the land underlying Moody 1 MOA. Each installation with flying operations must develop a Bird Hazard Warning System to inform aircrews of possible flight hazards due to bird activity in local areas (USAF 1998).

From a flight safety perspective, the primary BASH consideration is damage to the aircraft and the safety of the pilot. Therefore, only the Moody AFB aircraft bird strikes where aircraft was damaged are discussed. As shown in **Table 3-3**, the number of sorties at the installation decreased from 2005–2010 due to a change in aircraft types in 2007–2008. The number of damaging bird strikes and corresponding bird strike rate increased from 2005 to 2010 due to more detailed recordkeeping (Griffin 2011). From 2000 to 2010 an average of five bird strikes per year resulted in damage to Moody AFB aircraft (Griffin 2011).

Table 3-3. Damaging Bird Strike Data for Moody AFB Aircraft

Fiscal Year	Number of Sorties	Number of Damaging Bird Strikes	Damaging Bird Strike Rate Per 1,000 Sorties	Total Flying Hours
2000	12,383	5	0.4	20,938
2001	13,909	4	0.3	19,394
2002	30,265	2	0.1	38,871
2003	38,668	6	0.2	48,787
2004	37,660	0	0.0	48,651
2005	20,950	6	0.3	27,109
2006	N/A	4	N/A	N/A
2007	6,252	5	0.8	14,104
2008	8,066	8	1.0	18,512
2009	5,218	5	1.0	11,783
2010	8,238	6	0.7	16,306
10-year average (2000–2010)	18,161	5	0.5	26,446

Source: Griffin 2011

Note: N/A = Not Available

Nighttime Flying. As discussed in **Section 2.1** and shown in **Appendix A**, approximately 10 percent of the sortie-operations under baseline conditions are conducted at night (10 p.m. to 7 a.m.). Nighttime flying can pose an increased risk to pilots due to decreased visibility; however, an aircraft cannot be operated from sunset to sunrise unless it has lighted position, aviation, and landing lights. In addition, aircraft cannot be operated under VFR when the flight visibility is less than 3 miles.

Ordnance Use. On the ranges, ordnance use during training operations is always limited to the designated impact area. Range training operations are conducted in accordance with AFI 13-212 (Moody AFB 2006), which address range planning and operations. The Combat Readiness Training Center Instruction 13-212 also addresses range training operations at Townsend Range (TBR 2008). This Instruction defines operating parameters and assigns responsibilities for routine and emergency situations at Townsend Range, including restrictions, communications, attack headings, range entry and exist procedures, holding procedures, weapons delivery procedures, emergency procedures, fires, accidents, weather, lasers, and close air support procedures.

USAF safety standards require safeguards on weapons systems and ordnance to ensure against unintentional discharges. Aircraft munitions systems are equipped with mechanisms that prevent firing or release of the ordnance without activation of an electronic arming circuit. However, this mechanism cannot totally eliminate a system malfunction or material failure that could result in either the firing of ordnance or the release of a dud component that fails to operate properly. Studies have shown that the probability of such accidents is so small that the risk associated with the occurrence can be essentially dismissed (ACC 1999). Conversely, there is the possibility that a firing mechanism will be unsuccessful, resulting in “hung” ordnance. If this occurs on Moody AFB-based aircraft, the Range Control Officer (RCO) should instruct the pilot to follow the “Hung Ordnance/Gun Malfunction Procedures” provided in Moody AFB Instruction 11-250 (Moody AFB 2008a). Aircraft not based at Moody AFB are instructed to follow the procedures established by their particular command. If the hung ordnance procedures are

unsuccessful, the pilot would be directed to land at a military installation (avoiding overflight of populated areas during transit) where explosive ordnance disposal (EOD) personnel would dispose of the ordnance.

The Proposed Action does include an increase in inert ordnance as shown in **Table 2-2**. When inert air-to-ground ordnance, such as a bomb dummy unit (BDU), hits on or near a target, it could bounce, slide, or tunnel underground for some distance from the point of impact. The DOD Weapon Danger Zone (WDZ) Tool computer program is used by ROAs to define the minimum land required to deploy a given munition safely, using a certain aircraft and delivery tactic, over a specific soil density and target type. The WDZ is a three-dimensional zone that encompasses the ground and airspace for containment of projectiles, debris, and components resulting from the firing and detonation of aircraft-delivered ordnance. The WDZ accounts for weapon accuracy and failures of a munition delivered by an aircraft. ROAs prohibit weapons delivery unless a WDZ footprint has been applied to the target for the specific delivery platform, weapon type, and delivery parameters (USAF 2007a).

Defense flares are also managed as ordnance. Defensive countermeasures deployment in airspace used by Moody AFB aircraft is governed by a series of regulations based on safety, environmental considerations, and defensive countermeasures limitations (Moody AFB 2006). Flares are not used within the Moody 2 North and South MOAs under baseline conditions; however, flares are proposed in these MOAs under the Proposed Action.

3.2.3 Environmental Consequences

Evaluation Criteria

The significance of potential impacts on airspace management or air traffic depends on the degree to which the action would affect the airspace environment. Significant impacts could occur if the results were to impose major restrictions on air commerce opportunities, significantly limit airspace access to a large number of users, or require modifications to air traffic control systems.

Impacts on airspace use were assessed by comparing the projected military flight operations with existing conditions and with civil aviation activities in the defined ROI. This assessment included analyzing the capability of affected airspace elements to accommodate projected military activities, and determining whether such increases would have any adverse impacts on overall airspace use in the area. Also included are considerations of such factors as the interaction of the proposed use of specific airspace with adjacent controlled, uncontrolled, or other military training airspace; possible impacts on other nonparticipating civil and military aircraft operations; and possible impacts on civil airports that underlie or are proximate to the airspace involved in the proposal. The flight safety issues that could result from implementation of the Proposed Action are evaluated based on the likelihood that the activity would negatively affect the safety of the public, military personnel, and property (both military and civilian).

Proposed Action

Airspace Management

Impacts on airspace management are predicated on the extent to which the Proposed Action would affect air traffic within the MOAs, Restricted Areas, and LATN area analyzed in this EA. Implementation of the Proposed Action would not result in the need to reconfigure current military airspace, impose any major restrictions on air commerce opportunities, significantly limit airspace access to large numbers of users over current conditions, or require modifications to air traffic control systems.

The total number of sortie-operations associated with airspace analyzed in this EA would increase by approximately 41 percent under the Proposed Action as compared to baseline conditions (see **Table 2-1**). There are 37,158 annual sortie-operations under the baseline scenario and 52,426 annual sortie-operations under the Proposed Action. This increase is spread over a very large area, which includes nine MOAs, two Restricted Areas, and a LATN Area. The percent increase in sortie-operations varies by airspace area. As previously discussed, Moody AFB does not currently have any scheduling issues with their airspace and have determined that excess capacity is available. As shown in **Table 3-1**, the percentage of airspace available at Moody 1, Moody 2 North and South, and Live Oak MOAs is between 84 and 99 percent; therefore, there is adequate airspace available for the sortie-operations under the Proposed Action. Townsend Range also does not currently have any scheduling issues with their airspace and does not foresee any problems handling the 2,000 A-10 sortie operations under the Proposed Action (West 2009).

The number of A-10 sortie-operations in Bulldog A MOA would increase from 312 to 500 annually. This is an increase of 188 sortie-operations, which, on average, is less than 1 sortie-operation per day. In Bulldog B MOA there would an increase from 168 to 500 A-10 sortie-operations. This is an increase of 332 sortie-operations, which, on average, is about 1 additional sortie-operation per day. The coordination processes and procedures currently used to manage these MOAs are well-established and would not need to be altered under the Proposed Action.

No change to the times of use of the airspace is proposed; therefore, the increased use of the airspace during its existing published times would have no impact on civilian aviation. Aircraft departing from local airports underneath a MOA are held under the active airspace or are given a revised route in order to receive clearance to their requested altitude. This procedure would continue to be the preferred method of transitioning aircraft through the area when a MOA is active.

Flight Safety

Long-term, minor, adverse impacts on flight safety from aircraft mishaps would be expected as a result of the Proposed Action.

Mishaps. Aircraft mishap rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft. The mishap rate could increase because pilots are flying more sortie-operations in the airspace, which would increase the estimated flying time that an aircraft would be in the airspace. **Table 3-4** provides an estimate of the expected Class A mishaps per year under baseline and Proposed Action conditions for the three Moody AFB-based aircraft (A-10, C-130, and H-60).

As shown, less than one aircraft mishap per year would be expected under baseline conditions. The number of Class A mishaps per year would be expected to increase by 57 percent for the A-10 aircraft, 27 percent for the C-130 aircraft, and 35 percent for the H-60 helicopter from the proposed increase in sortie-operations under the Proposed Action. However, under the Proposed Action less than one Class A mishap per year for each aircraft type would still be expected. As previously mentioned, in FY 2011 there was one Class A mishap at Moody AFB. Qualified pilots would be conducting the proposed aircraft sortie-operations within the airspace analyzed in this EA. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews, including Moody AFB airmen and other airspace users. The continued implementation of *The USAF Mishap Prevention Program* (AFI 91-202) would also reduce the potential for mishaps (USAF 1998).

Table 3-4. Expected Class A Mishaps Per Year under Baseline and Proposed Action Conditions

	A-10 Aircraft	C-130 Aircraft	H-60 Helicopter
USAF-wide 10-year Average Class A Mishap Rate per 100,000 Flying Hours *	1.1	0.32	4.58
Baseline Annual Flying Hours	16,068	1,932	4,147
Expected Class A Mishaps Per Year under Baseline Conditions	0.18	0.01	0.19
Proposed Action Annual Flying Hours	25,227	2,450	5,600
Expected Class A Mishaps Per Year under Proposed Action Conditions	0.28	0.01	0.26
Percent Increase in Class A Mishaps from Baseline to Proposed Action	57	27	35

Note: *Source is AFSC 2010d. Please see **Appendix A** for more information on the amount of time aircraft are present in the airspace per sortie-operation.

No impacts would be expected to the existing exclusion areas. Military pilots using the MOAs are already aware of the exclusion areas and are instructed to stay 1,500 feet AGL or above while in the exclusion areas.

BASH. Long-term, minor, adverse effects on flight safety would be expected to increase slightly from BASH issues under the Proposed Action. There is always a possibility of bird and wildlife strikes whenever aircraft operate, especially when operating in close proximity to the ground. As discussed in **Section 3.8**, the ROI includes several water features (e.g., swamps and wetlands), which attract large-body bird species. The vast majority of aircraft-wildlife collisions involve common, large-body birds (e.g., gulls, waterfowl, wading birds, and raptors) or large flocks of smaller birds (FAA 2003); therefore, the likelihood of an aircraft-bird collision is higher in the ROI than it might be for other areas. Under the Proposed Action, the number of annual sortie-operations flown by Moody AFB airmen would increase, which would also increase the number of hours pilots spend in the airspace. Since pilots are spending more time in the airspace, the likelihood that a bird strike could occur would also increase. As shown in **Table 3-5**, 19 damaging bird strikes per year are estimated to be expected under baseline conditions, and 26 damaging bird strikes per year are estimated to be expected under Proposed Action conditions (a 41 percent increase). The continued implementation of AFI 91-202, *The USAF Mishap Prevention Program*, which includes BASH prevention program requirements, would also reduce the potential for mishaps (USAF 1998). BASH issues in the ROI as they relate to biological resources are discussed in **Section 3.8**.

Table 3-5. Expected Damaging Bird Strikes under Baseline and Proposed Action Conditions

	Number of Annual Sortie-Operations	Moody AFB Aircraft Average Damaging Bird Strike Rate Per 1,000 Sorties	Expected Number of Damaging Bird Strikes Per Year
Baseline	37,158	0.5	19
Proposed Action	52,426	0.5	26
Percent Increase	41	--	41

Source for bird strike rate: Griffin 2011

Note: Expected number of damaging bird strikes is rounded. The damaging bird strike rate is an average of the damaging bird strike rates from 2000–2010 as shown in **Table 3-3**.

Nighttime Flying. Negligible impacts on flight safety would be expected from the continuation of nighttime sortie-operations under the Proposed Action. The percentage of nighttime operations would increase slightly under the Proposed Action. Overall, approximately 10 percent of all sortie-operations under baseline conditions and 14 percent under the Proposed Action would be conducted at night (10 p.m. to 7 a.m.). As discussed previously, the same safe flying procedures, adherence to flight rules, and knowledge of emergency procedures that form consistent and repeated aspects of training for all aircrews, including Moody AFB airmen and other users of the airspace within the ROI, also apply to nighttime flying operations. The continued implementation of FAR Part 91, *General Operating and Flight Rules*, would also reduce any potential impacts on flight safety from nighttime flying operations.

Ordnance Use. Implementation of the Proposed Action would increase the total ordnance use at Townsend Range by approximately 77 percent from baseline annual ordnance use (see **Table 2-2**). However, this increase would be generally confined to the designated impact area at each range. The primary training munitions associated with the A-10 aircraft is its seven-barrel Gatling gun that fires 30-mm rounds. The Proposed Action includes a 240 percent increase from baseline ordnance use for 30-mm rounds at Townsend Range from A-10 aircraft based at Moody AFB. Other munitions types that are used at Townsend Range and would increase under the Proposed Action include the BDU-33, BDU-50/MK-82, and 2.75-inch rockets. The use of the MK-83, BDU-56/MK-84, 7.62-mm rounds, and 20-mm rounds would not increase above baseline conditions under the Proposed Action. The Proposed Action does not include an increase in live ordnance use.

While there are several mechanical systems on the aircraft that are specifically designed to prevent the accidental release of ordnance, safety is still a concern because the system is man-made. While it is impossible to state that an accidental release of ordnance would never occur, safety risk analyses show that the occurrence of accidental releases that could pose a serious safety concern is so small that it can be essentially dismissed (ACC 1999). Therefore, an accidental release is not impossible, but it is highly unlikely.

Long-term, negligible to minor, adverse effects on flight safety would be expected to increase slightly under the Proposed Action from ordnance use at Townsend Range. Long-term, negligible to minor, adverse effects currently exist since these ranges are used for aircraft-related ordnance training. The existing and comprehensive safety protocols set forth in the local range supplements described in **Section 3.2.2** would continue to reduce the risk to flight safety from ordnance use. As has occurred previously, it is expected that the local range supplement for Townsend Range would be expanded to include the increase in ordnance use under the Proposed Action (TBR 2008). The Proposed Action would not be expected to adversely affect the ability of the RCO to conduct range maintenance activities. Per AFI 13-212, a WDZ footprint would be generated prior to ordnance use. All ordnance would continue to be handled by trained and qualified personnel acting in accordance with established ordnance safety protocols. Existing standard safety practices that limit public access to training areas while training is taking place would continue to be observed.

In August 1997, ACC finalized an in-depth summary of the types of flares used within ACC-controlled military airspace, and the general effects of their use on the environment entitled *Environmental Effects of Self-Protection Chaff and Flares* (USAF 1997). ACC developed guidelines to assist in the assessment of the environmental impacts of proposals with flare use and to prepare documentation to comply with NEPA. The guidelines are based on the findings and conclusions of the study concerning the potential effects of flares on health, safety, air quality, physical resources (e.g., soil and water resources), biological resources, land use and visual resources, and cultural resources. Issues that were documented in the study were found to have no significant environmental impacts (USAF 1997). Flares would also be used in accordance with AFI 11-214. Therefore, the use of flare training in the Moody 2 North and South MOAs

under the Proposed Action would have no significant environmental impacts on aircraft safety. Environmental impacts on biological resources from flare use are discussed in **Section 3.8.3**.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. The airspace areas used by Moody AFB airmen, and the number of aircraft sortie-operations and ordnance use in that airspace would remain unchanged. There would be no change in the existing conditions as described in **Section 3.2.2**. No effects on airspace management or flight safety above existing levels would be expected.

3.3 Noise

3.3.1 Definition of the Resource

Noise represents the most identifiable concern associated with aircraft operations. Although communities and even isolated areas receive more consistent noise from other sources (e.g., cars, trains, construction equipment, stereos, wind), the noise generated by aircraft overflights often receives the greatest attention. General patterns concerning the perception and effect of aircraft noise have been identified, but attitudes of individual people toward noise are subjective and depend on their situation when exposed to noise. Therefore, annoyance is considered the primary consequence of aircraft noise. The subjective impression of noise and the disturbance of activities are believed to contribute significantly to the general annoyance response. A number of non-noise-related factors have been identified that might influence annoyance. Annoyance from aircraft noise is discussed further in **Section 3.3.3**.

Sound is measured with instruments that record instantaneous sound levels in decibels. The terms noise and sound are often used interchangeably. Physically there is no difference between these concepts, although it is an important distinction for the human listener. Noise is defined as any sound that is unwanted because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day.

Noise Metrics

Aircraft Noise. Noise levels, resulting from multiple single events, are used to characterize community noise effects from aircraft operations and are modeled using the day/night average sound level (L_{dn}). A-weighted decibels (dBA) are used to characterize sound levels that emphasize the frequency range most sensitive to the human ear. “A-weighted” denotes the adjustment of the frequency content of a sound-producing event to represent the way in which the average human ear responds to the audible event. dBA is used to evaluate continuous noise sources such as vehicle, aircraft, and small arms (weapons that are 50-caliber and below) (USACHPPM 2005); therefore, these noise sources are discussed in dBA in this EA. How an individual responds to the sound source will determine if the sound is viewed as music to one’s ears or as annoying noise. Noise-sensitive land uses can be specific (i.e., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) in which occasional or persistent sensitivity to noise above ambient levels exists.

The L_{dn} metric is the most widely accepted metric for characterization of the noise environment. L_{dn} is the energy-averaged sound level measured over a 24-hour period, with a 10-dBA penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. to account for increased annoyance. L_{dn} is the energy average of all noise events that occur during a 24-hour period; it is not the sound level heard at any

given time. L_{dn} is the preferred sound level metric used to characterize noise impacts by FAA, U.S. Department of Housing and Urban Development, U.S. Environmental Protection Agency (USEPA), and DOD for modeling airport environments.

To account for the startle effect of noise events such as low-altitude overflights by high-speed military aircraft that are characterized by high onset rates (i.e., the noise level increases very rapidly), the USAF has developed a noise metric specifically for SUA under direction of the Armstrong Aerospace Medical Research Laboratory called the onset rate-adjusted day/night average sound level (L_{dnmr}). The L_{dnmr} metric represents an average for an entire month, using the highest monthly operational flying activity. The L_{dnmr} includes a 10-dBA penalty for events occurring between 10:00 p.m. and 7:00 a.m. to account for the increased intrusiveness of events that occur during this period when ambient noise levels are generally low and many persons are asleep or engaged in activities subject to interference by high noise levels, such as watching television or listening to music. An additional penalty of up to 11 dBA is added to compensate for the startle effects of a low-altitude overflight.

The USAF recommends that the L_{dnmr} be used as the primary metric for assessing the impacts on people from aircraft operations within MOAs and in the vicinity of bombing ranges. The USAF further recommends that the L_{dnmr} be used in a manner equivalent to the L_{dn} in assessing the land use compatibility of military aircraft noise in such areas. Environmental sound levels below 65 dBA L_{dn} are considered compatible with all land uses, including residential development (FICON 1992), and a 55 dBA L_{dn} has been identified by the USEPA as adequate to protect human health and welfare with an adequate margin of safety (USEPA 1974). Land uses in the ROI are discussed in **Section 3.4.2**.

Although the L_{dn} or L_{dnmr} is the most useful single metric for characterizing the long-term noise environment, other metrics are useful in characterizing the noise associated with individual events such as a single aircraft flyover. Of the available metrics, the Sound Exposure Level (SEL) is the most useful because it is a composite metric that takes into account the most important characteristics of time-varying noise events such as aircraft flyovers, the changing sound levels that occur during the event, and the duration of the noise event. The SEL is a measure of the total sound exposure of an event compressed into a 1-second time interval. Thus, it takes in the sound energy of the event and represents it as a steady noise level that lasts for 1 second. It is important to note that the SEL does not represent the level of sound heard at any specific instant; however, it provides a measure of the total sound energy of a single event and permits comparison of events that differ in both level and duration.

Ordnance Noise. Impulsive noise is abrupt, short-duration, intense, low-frequency noise that can cause vibration in nearby homes. Impulsive noise is generated by large-caliber weapons (20-mm and greater), sonic booms, detonation of explosives, explosive ordnance, and demolition (USACHPPM 2005). Most people find lower-frequency sounds such as impulsive noise more annoying than other noises (USACHPPM undated). The A-weighted scale is not effective in characterizing human response to impulse noises. To assess the annoyance caused by low frequency vibration of structures, the C-weighted scale is used to evaluate impulsive noise (USACHPPM 2005). C-weighted decibels (dBC) incorporate a slight de-emphasis of the low and high portions of the audible frequency spectrum. Ordnance noise sources are discussed in terms of dBC in this EA. Large-caliber ordnance noise is assessed using noise zone defined by noise contours that are associated with the noise levels 57, 62, and 70 dBC L_{dn} .

Outdoor Noise Levels

Noise levels in residential areas vary depending on the housing density and location. As shown in **Table 3-6**, a normal suburban area is about 55 dBA L_{dn} , which increases to 60 dBA L_{dn} for an urban residential area, and to 80 dBA L_{dn} in the downtown section of a city (FHWA 1980).

Table 3-6. Typical Outdoor Noise Levels

Noise Level (L_{dn})	Location
50 dBA	Residential area in a small town or quiet suburban area
55 dBA	Suburban residential area
60 dBA	Urban residential area
65 dBA	Noisy urban residential area
70 dBA	Very noisy urban residential area
80 dBA	City noise (downtown of major metropolitan area)
88 dBA	3rd floor apartment in a major city next to a freeway

Source: FHWA 1980

3.3.2 Description of the Affected Environment

The ROI for the Proposed Action includes nine MOAs, two Restricted Areas, and a LATN area currently used by Moody AFB airmen, as shown on **Figure 1-2**, and the land areas underneath this airspace. The airspace analyzed in this EA is currently in existence; no new airspace is required under the Proposed Action. Sensitive land uses beneath the airspace, such as wildlife refuges or parks, are discussed in **Section 3.4.2**. Exclusion areas within the airspace, such as those that surround local airports for safety reasons or surround cities to prevent military aircraft from overflying noise-sensitive areas, are discussed in **Section 3.2.2**.

The airspace is also spread across a large predominately rural area that includes portions of 169 counties: 121 in Georgia, 29 in Florida, 15 in Alabama, and 4 in South Carolina. Typically, in rural areas, the dominant noise sources consist of vehicle traffic and industrial facilities. Multiple interstate highways, state routes, and local roadways are within the ROI.

Analysis Methodology and Baseline Noise Levels

Aircraft Noise. To allow estimation of the long-term sound levels associated with operations in MOAs and at the airspace associated with bombing ranges, the USAF has developed the *MOA and Range NOISEMAP* (MR_NMAP). This computer-based model is designed to predict the levels associated with aircraft operations that occur sporadically in military airspace. MR_NMAP was used to calculate noise levels associated with the airspace analyzed in this EA for the baseline and Proposed Action annual sortie-operations as shown in **Table 2-1**. Data (shown in **Appendix A**) concerning the type of aircraft, number of sortie-operations by time of day, power levels, aircraft speed, and altitude distributions were entered into the model. The MR_NMAP program was then used to calculate the average distributed L_{dnmr} level in areas underlying the MOAs, R-3008 associated with Grand Bay Range, R-3007 associated with Townsend Range, and the LATN area. In addition, the model also calculated the number of events that would exceed 65 dBA SEL within an area underlying a MOA, the two Restricted Areas, or the LATN area. The results of this analysis for baseline conditions are summarized in **Table 3-7**. The average distributed L_{dnmr} level for R-3008A (associated with Grand Bay Range) is shown separately because this airspace is within the Moody AFB installation boundary (see **Appendix A**). As shown, none of the noise levels reach 65 dBA L_{dnmr} in the assessed areas under baseline conditions.

Table 3-7. Noise Levels Associated with Baseline Annual Sortie-Operations

Airspace	Baseline ^a	
	<i>Estimated Maximum L_{dnmr}</i>	<i>Events above 65 dBA SEL per month ^b</i>
Moody 1 MOA	< 55 dBA	0
Moody 2 North MOA	< 55 dBA	4
Moody 2 South MOA	< 55 dBA	2
Moody 3 MOA	< 55 dBA	1
Live Oak MOA	< 55 dBA	0
Bulldog A MOA	< 55 dBA	0
Bulldog B MOA	< 55 dBA	1
Coastal 1 East MOA	< 55 dBA	0
Coastal 1 West MOA	< 55 dBA	1
Grand Bay Range (R-3008A)	64.4 dBA	11
Grand Bay Range (R-3008B–D) ^c	59.4 dBA	5
Townsend Range (R-3007) ^d	< 55 dBA	1
LATN Area	< 55 dBA	0

Notes:

- Data concerning the type of aircraft, number of sortie-operations by time of day, power levels, aircraft speed, altitude distribution, and route width are provided in **Appendix A**.
- SEL values are rounded.
- The noise levels shown for Grand Bay Range are for R-3008B, C, and D combined.
- The noise levels shown for Townsend Range are for R-3007A, B, C, and D combined.

Noise from Ordnance Use. Ordnance firing can result in short-duration, high-level noise impacts. To allow estimation of the long-term noise levels associated with heavy weapons use, the U.S. Army has developed BNOISE2. This computer-based model takes into account the weapon type, ammunition, direction of firing, target noise, target location, and environmental factors. Weather and geographic factors (e.g., topography and tree cover) can be major factors in heavy weapon noise (such as ordnance use) from the source to the receiver. Depending on local conditions, noise levels at a given point can range from barely audible to very loud and annoying.

BNOISE2 was used to calculate noise levels associated with the ordnance expenditures analyzed in this EA for the baseline and Proposed Action annual ordnance use as shown in **Table 2-2**. Data (shown in **Appendix A**) concerning the type of ordnance and number of rounds fired by time of day were entered into the model. The BNOISE2 program was then used to model noise contours from baseline and Proposed Action ordnance use at Townsend Range as shown in **Section 3.3.3**. At Townsend Range, the noise contours from large-caliber weapons under baseline conditions do not extend beyond the range boundary.

Noise Complaints. Noise complaints in the vicinity of Moody AFB (i.e., R-3008; and Moody 1, 2, and 3 MOAs) resulting from aircraft based at Moody AFB are infrequent. The majority of the complaints received by the installation are the result of transient fighter aircraft (e.g., F-18) flights from other installations that were using Moody AFB's airspace. If a complaint is received, Moody AFB personnel identify the aircraft that caused it (i.e., aircraft based at Moody AFB or transient aircraft) and verify if the flight was performed within the confines of permissible procedures. These policies ensure that aircraft abide by local flight restrictions, such as avoiding noise-sensitive areas (Lopez 2011b).

Townsend Range does have a noise hotline; however, noise complaints are rare. If a complaint is received, Townsend Range generally instructs the aircraft to move away from the noise-sensitive receptor (West 2009).

3.3.3 Environmental Consequences

Evaluation Criteria

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., if the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Projected noise effects were evaluated quantitatively for the alternatives considered.

Noise contours are used to visually create a continuous line that connects the points of the same noise exposure level, in much the same way as ground contours on a topographic map visually represent lines of equal elevation. These noise contours are drawn in specific increments and are overlaid on a map. The area encompassed by noise contours is known as a noise zone. Noise zones are uniquely suited for making land use and zoning decisions based on noise exposure.

Annoyance. Noise can cause a person to become annoyed. Noise annoyance is defined by USEPA as any negative subjective reaction to noise by an individual or group. Annoyance represents the primary effect associated with aircraft noise. L_{dn} is the accepted unit for quantifying community annoyance to general environment noise, including aircraft noise.

Table 3-8 presents the percentages of people that would be projected to be “highly annoyed” when exposed to various levels of noise measured in L_{dn} . This table presents the results of more than a dozen studies of the relationship between noise events and human annoyance. This relationship was suggested in 1977 by the National Academy of Sciences and was subsequently reevaluated for use in describing people’s reaction to semicontinuous (transportation) noise (Finegold et al. 1994). The data shown provide a perspective on the level of annoyance that might be anticipated. For example, 12 to 22 percent of persons exposed on a long-term basis to 65 to 69 dBA L_{dn} are expected to be annoyed by these noise exposure levels.

Table 3-8. Percentage of Population Highly Annoyed by Aircraft Noise Exposure Levels

Noise Zone (L_{dn})	Percentage of Persons Highly Annoyed	
	<i>Low</i>	<i>High</i>
55–59 dBA	3	7
60–64 dBA	7	12
65–69 dBA	12	22
70–74 dBA	22	36
75–79 dBA	36	54
80+ dBA	> 54	

Source: Finegold et al. 1994

Table 3-9 presents the percentages of people that would be projected to be highly annoyed when exposed to various levels of noise measured in dBC L_{dn} . The 57 to 62 dBC L_{dn} noise zone was established as a planning tool to account for days when operations are higher than average, which could result in possible adverse reactions. The 57 to 62 dBC L_{dn} noise zone provides the installation with a means to predict possible complaints and meet the public demand for a description of what will exist during a period of increased operations. The percent of people within the 57 to 62 dBC L_{dn} noise zone who are likely to be annoyed from ordnance noise ranges from 9 to 15 percent. This increases to 15 to 39 percent for populations within the 62 to 70 dBC L_{dn} noise zone and greater than 39 percent for those within the 70+ dBC L_{dn} .

Table 3-9. Percentage of Population Highly Annoyed by Ordnance Noise Exposure Levels

Noise Zone (L_{dn})	Percentage of Persons Highly Annoyed	
	<i>Low</i>	<i>High</i>
57–62 dBC	≥ 9	< 15
62–70 dBC	15	39
70+ dBC	39+	

Source: USACHPPM 2005

The 7.62-mm ordnance use does not increase under the Proposed Action (see **Table 2-2**); therefore, it is not discussed in detail in this EA.

Aircraft Overflights. The ambient noise level in a quiet suburban residential area in the daytime is generally 50 dBA L_{dn} , which increases to 60 dBA L_{dn} for an urban residential area, and 80 dBA L_{dn} for the downtown area of a major city in the daytime (USEPA 1974). As discussed in **Section 3.4.2**, most of the land underlying the MOAs, Restricted Areas, and the LATN area is undeveloped, and is classified as forested or agricultural, with some woody wetlands (USGS 2001). The USEPA estimates the ambient sound level of agricultural areas at a 44 dBA L_{dn} (USEPA 1974). Individual A-weighted sound levels can vary widely depending upon the location, season, and weather. Levels can range from 20 dBA up to 60 dBA.

Individuals are often interested in what they might personally experience from an aircraft overflight in their vicinity. If an aircraft passes directly overhead at low altitude, the noise levels can exceed 100 dBA SEL. Using the Flyover Noise Calculator developed by the USAF Research Laboratory at Wright-Patterson AFB, Ohio, SEL values were modeled for various altitudes for the aircraft types included under the Proposed Action (**Figure 3-1**). As shown, the SEL decreases as the altitude of the aircraft increases. The Moody AFB-based aircraft (i.e., A-10, HC-130, and HH-60) are some of the quietest aircraft under the Proposed Action. In addition, the A-10 and HC-130 aircraft are some of the quietest aircraft in the USAF inventory.

When aircraft operations occur in an area, it is important to understand that individual aircraft flyovers are typically heard for only a few seconds. The instantaneous noise level is very low at the beginning and end of this period. As the aircraft approaches, the sound level increases to some maximum level depending on how close the aircraft comes to the receiver or individual on the ground. If an aircraft passes to the side of a person (or any receiver) at some distance, the maximum noise level experience would be lower, but the levels would be near that maximum for a longer period of time. For example, if a

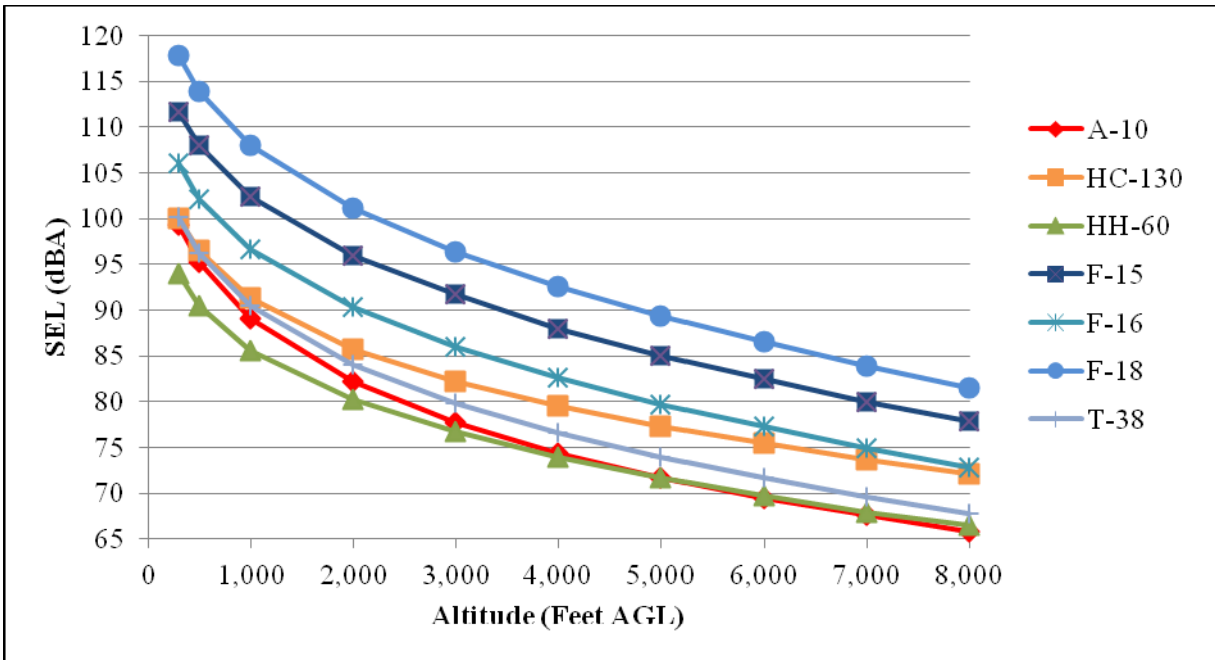


Figure 3-1. SELs for the Aircraft Types Under the Proposed Action

person were half a mile to the side, the noise level would be 10 to 15 dBA lower than if the overflight were directly overhead. The SELs provided in **Figure 3-1** include the aircraft directly overhead at the altitudes shown. An aircraft 2 to 3 miles away might not be heard at all. Weather conditions, maintenance requirements, mission requirements, and other factors can cause variations in daily training activities. The likelihood of an aircraft flying over an individual noise receptor varies depending upon the type of airspace being flown in. Typically, residences and cities are overflown at a minimum altitude of 1,000 feet AGL.

Proposed Action

Long-term intermittent adverse impacts on the noise environment are expected to increase slightly under the Proposed Action as result of aircraft noise. Noise from aircraft overflights currently exists under baseline conditions because the airspace areas analyzed under the Proposed Action are currently in use; therefore, the increase in intermittent aircraft overflights under the Proposed Action would result in long-term, minor, adverse impacts.

The Proposed Action does not include any construction or personnel changes at Moody AFB or the other users of the airspace within the ROI. Therefore, there would be no change in the amount of vehicle noise. As discussed in **Section 1.2**, the 2006 BRAC EA analyzed the additional 48 PAA at Moody AFB, which included a noise analysis at the airfield. In the BRAC EA, the noise contours under the Proposed Action decreased by 88 percent from baseline conditions. This is the result of the replacement of T-38 and T-6 aircraft with the A-10 aircraft, which are quieter. In addition, there was a reduction in the number of closed patterns and in the total number of airfield operations (approximately 80 percent) (Moody AFB 2006). With a reduction of 88 percent, the increase that would occur at Moody AFB as a result of the additional sortie-operations analyzed in this EA would not be significant.

Aircraft Sortie-Operations. The baseline and Proposed Action annual sortie-operations summarized in **Table 2-1**, and the data consisting of the type of aircraft, power levels, aircraft speed, and altitude distributions shown in **Appendix A** were entered into the MR_NMAP model to estimate the maximum

L_{dnmr} levels expected to occur as a result of the baseline and Proposed Action sortie-operations. The results of this analysis are summarized in **Table 3-10**, which shows the average L_{dnmr} noise level in the areas under each of the MOAs, the airspace surrounding Grand Bay Range and Townsend Range, and the LATN area.

Table 3-10. Noise Levels Associated with Baseline and Proposed Action Annual Sortie-Operations

Airspace	Baseline ^a		Proposed Action ^a	
	<i>Estimated Maximum L_{dnmr}</i>	<i>Events above a 65 dBA SEL per month ^b</i>	<i>Estimated Maximum L_{dnmr}</i>	<i>Events above a 65 dBA SEL per month ^b</i>
Moody 1 MOA	< 55 dBA	0	< 55 dBA	0
Moody 2 North MOA	< 55 dBA	4	< 55 dBA	2
Moody 2 South MOA	< 55 dBA	2	57.7 dBA	2
Moody 3 MOA	< 55 dBA	1	< 55 dBA	1
Live Oak MOA	< 55 dBA	0	< 55 dBA	0
Bulldog A MOA	< 55 dBA	0	< 55 dBA	0
Bulldog B MOA	< 55 dBA	1	< 55 dBA	1
Coastal 1 East MOA	< 55 dBA	0	< 55 dBA	0
Coastal 1 West MOA	< 55 dBA	1	< 55 dBA	1
Grand Bay Range (R-3008A)	64.4 dBA	11	69.6 dBA	11
Grand Bay Range (R-3008B–D) ^c	59.4 dBA	5	64.0 dBA	5
Townsend Range (R-3007) ^d	< 55 dBA	1	< 55 dBA	1
LATN Area	< 55 dBA	0	< 55 dBA	0

Notes:

- Data concerning the type of aircraft, number of sortie-operations by time of day, power levels, aircraft speed, altitude distribution, and route width are provided in **Appendix A**.
- SEL values are rounded.
- The noise levels shown for Grand Bay Range are for R-3008B, C, and D combined.
- The noise levels shown for Townsend Range are for R-3007A, B, C, and D combined.

Total sortie-operations associated with the baseline scenario would increase by approximately 41 percent under the Proposed Action (see **Table 2-1**). There are 37,158 annual sortie-operations under the baseline scenario and 52,426 annual sortie-operations under the Proposed Action. However, this increase is spread over a very large area, which includes nine MOAs, two Restricted Areas, and a LATN Area. As discussed in **Section 3.3.1**, 55 dBA L_{dn} has been identified by the USEPA as adequate to protect human health and welfare with an adequate margin of safety, and levels below 65 dBA L_{dn} are considered compatible with all land uses (USEPA 1974). The USAF recommends that the L_{dnmr} be used in a manner equivalent to the L_{dn} in assessing the land use compatibility of military aircraft noise in such areas.

As shown in **Table 3-10**, noise levels in the MOAs are less than 55 dBA L_{dnmr} for the baseline and Proposed Action annual sortie-operations, with the exception of Moody 2 South MOA under the Proposed Action, which is estimated to have a noise level of approximately 57.7 dBA L_{dnmr} . The L_{dnmr} levels in all the airspace associated with Grand Bay Range (i.e., R-3008A, B, C, and D) for both operational scenarios would also exceed 55 dBA L_{dnmr} . The majority (approximately 56 percent) of the noise levels in the MOAs are below the estimated ambient sound level of approximately 44 dBA L_{dnmr} , however noise levels in four airspace areas (i.e., Moody 2 North, Moody 2 South, Coastal 1 East, and Coastal 1 West MOAs) would be above 44 dBA L_{dnmr} for baseline and Proposed Action conditions. The noise levels in the airspace associated with both ranges for both operational scenarios would be above 44 dBA L_{dnmr} .

The noise levels within R-3008A (the portion of the airspace associated with Grand Bay Range that is within the Moody AFB installation boundary) under the Proposed Action would exceed 65 dBA L_{dnmr} . Under the baseline scenario, the noise level in R-3008A is 64.4 dBA L_{dnmr} and would increase to 69.6 dBA L_{dnmr} under the Proposed Action. Noise levels of 69.6 dBA L_{dnmr} exceed the threshold of 65 dBA L_{dnmr} required for land use planning. However, land within R-3008A is entirely Moody AFB property; no residences are present based on a review of 2010 aerial photography. Please see **Section 3.4.2** for details on land use in this area.

Under the Proposed Action, the likelihood that a high-speed aircraft flyover would startle a receptor on the ground would slightly increase. The areas underlying the airspace are predominately rural; therefore, the startle effect would be limited to a small number of noise receptors underneath the aircraft's flight path. In more populated areas pilots would continue to observe the rules stipulating that aircraft must avoid congested areas and settlements by 1,000 feet AGL; stay within a horizontal radius of 2,000 feet of other aircraft; and avoid isolated people, vessels, vehicles, or structures by 500 feet (AFI 11-202 and FAR Part 91-119).

Based on annoyance factors correlated to aircraft noise (see **Table 3-8**), less than 12 percent of people living under the airspace would be expected to be highly annoyed. As shown in **Table 3-10**, under baseline conditions no events per month above 65 dBA SEL would be expected in the areas underlying the Moody 1, Live Oak, Bulldog A, and Coastal 1 East MOAs; and the LATN area. Approximately one event above 65 dBA SEL per month occurs in the areas underlying the Moody 3, Bulldog B, and Coastal 1 West MOAs under baseline conditions. Approximately two events above 65 dBA SEL per month occur in the areas underlying Moody 2 South MOA under baseline conditions. The number of events above 65 dBA SEL would not increase under the Proposed Action in the areas underlying these MOAs. The number of events above 65 dBA SEL in Moody 2 North MOA would decrease from four per month under baseline conditions to two per month under the Proposed Action. The airspace within the ROI is currently in use, so intermittent aircraft overflights in these areas are already occurring. As previously discussed, under the Proposed Action the number of SEL events above 65 dBA in the areas underlying the MOAs and LATN area would either decrease or remain the same as under baseline conditions. Therefore, long-term, negligible, adverse impacts on the noise environment for the areas underlying the MOAs and LATN area are expected to continue under the Proposed Action as result of SEL events above 65 dBA per month.

As shown in **Table 3-10**, the number of events above 65 dBA SEL in R-3008 (associated with Grand Bay Range) and R-3007 (associated with Townsend Range) would not increase under the Proposed Action. Eleven events above 65 dBA SEL in R-3008A, five events in R-3008B-D, and one event in R-3007 would occur under baseline and Proposed Action conditions. The airspace associated with Grand Bay and Townsend Ranges is currently in use, so intermittent aircraft overflights in these areas presently occurs. Therefore, it is expected that events per month above 65 dBA SEL for the Proposed Action would continue to have a long-term, negligible, adverse impact on the areas underlying R-3008 and R-3007.

The maximum cumulative L_{dnmr} levels at locations where ranges overlap with MOAs was estimated. As shown on **Figure 1-2**, the Moody LATN area overlaps with all the other airspace areas analyzed in this EA. Since the noise levels in the LATN area are below 35 dBA L_{dnmr} , the overlap of a single airspace component with the LATN area would not increase the cumulative L_{dnmr} level by a significant amount. Therefore, only the areas where two airspace components overlap with the LATN area were analyzed. These three areas, the estimated maximum cumulative L_{dnmr} level under baseline and Proposed Action conditions, and the percent increase between baseline and Proposed Action conditions are shown in **Table 3-11**.

Table 3-11. Cumulative Noise Levels Associated with Baseline and Proposed Action Annual Sortie-Operations

Overlapping Airspace	Baseline	Proposed Action	Percent Increase ^a
	<i>Estimated Maximum Cumulative L_{dnmr}</i>	<i>Estimated Maximum Cumulative L_{dnmr}</i>	
Coastal 1 East MOA, R-3007 ^b , LATN area	53.3 dBA	54.0 dBA	1
Bulldog A MOA, Bulldog B MOA, LATN area	43.6 dBA	44.2 dBA	1
Moody 1 MOA, R-3008 ^c , LATN area	65.6 dBA	70.7 dBA	8

Notes:

a. Percent increases are rounded.

b. The noise levels analyzed for Townsend Range are for R-3007A, B, C, and D combined.

c. The noise levels analyzed for Grand Bay Range are for R-3008A, B, C, and D combined.

As shown in **Table 3-11**, cumulative noise levels for the first two areas listed would be below 65 dBA L_{dnmr} , under baseline conditions and the Proposed Action. Therefore, there would be no increased impact on the noise environment in these areas as a result of the Proposed Action. The cumulative noise levels for the third area listed in the table (Moody 1 MOA, R-3008, and the LATN area) is 65.6 dBA L_{dnmr} under baseline conditions and 70.7 dBA L_{dnmr} under the Proposed Action. Land uses underlying these overlapping airspace components are discussed in **Section 3.4.3**. Long-term, intermittent, minor, adverse impacts on the noise environment would be expected to increase slightly as a result of the aircraft noise associated with the Proposed Action.

As discussed in **Section 2.1** and shown in **Appendix A**, overall approximately 10 percent of all sortie-operations under baseline and 14 percent Proposed Action conditions would be conducted at night (10 p.m. to 7 a.m.). However, since there would be an increase in annual sortie-operations of approximately 41 percent under the Proposed Action, the total number of nighttime sortie-operations would increase by approximately 104 percent from baseline to Proposed Action conditions. The percent increase in nighttime annual sortie-operations from baseline to Proposed Action conditions varies by aircraft type, and includes a 292 percent increase for A-10 aircraft, a 37 percent increase for HC-130 aircraft, a 52 percent increase for HH-60 helicopters, and a 13 percent increase for the “other” aircraft types analyzed in this EA. As discussed in **Section 3.3.1**, the L_{dnmr} noise metric includes a 10-dBA penalty for events occurring between 10:00 p.m. and 7:00 a.m. to account for the increased intrusiveness of events that occur during this period when ambient noise levels are generally low and many persons are asleep or engaged in activities subject to interference by high noise levels, such as watching television or listening to music. Therefore, the L_{dnmr} levels shown in **Table 3-10** already include this penalty for nighttime flying to account for increase annoyance. As discussed previously, based on annoyance factors correlated to aircraft noise (see **Table 3-8**), less than 12 percent of people (with the exception of R-3008A) living under the airspace analyzed in this EA would be expected to be highly annoyed. Approximately 22 to 36 percent of persons living under R-3008A would be expected to be highly annoyed. However, as discussed previously, land under R-3008A consists entirely of Moody AFB property and no residences are present. Consequently, no significant impacts on the noise environment would be expected.

Ordnance Use. The primary training munitions associated with the A-10 aircraft is the Gatling gun that fires 30-mm rounds. As shown in **Table 2-2**, the Proposed Action includes a 240 percent increase from baseline ordnance use for 30-mm rounds at Townsend Range. Other munitions types that would continue to be used at Townsend Range at new expenditure rates under the Proposed Action include the BDU-33, BDU-50/MK-82, and 2.75-inch rockets. The use of the MK-83, BDU-56/MK-84, 7.62-mm rounds, and 20-mm rounds would not increase above baseline conditions under the Proposed Action. These ordnances are inert; the Proposed Action does not include an increase in live ordnance use.

As shown on **Figure 3-2**, noise from ordnance use at Townsend Range under the baseline and Proposed Action conditions is completely within the range boundary. Therefore, there would continue to be no impacts on the noise environment outside the Townsend Range boundary under the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented. Long-term, intermittent, minor, adverse impacts on the noise environment would be expected to continue as a result of the noise from aircraft overflights and ordnance use associated with baseline conditions. The number of aircraft sortie-operations from Moody AFB would remain unchanged in the associated airspace.

3.4 Land Use

3.4.1 Definition of the Resource

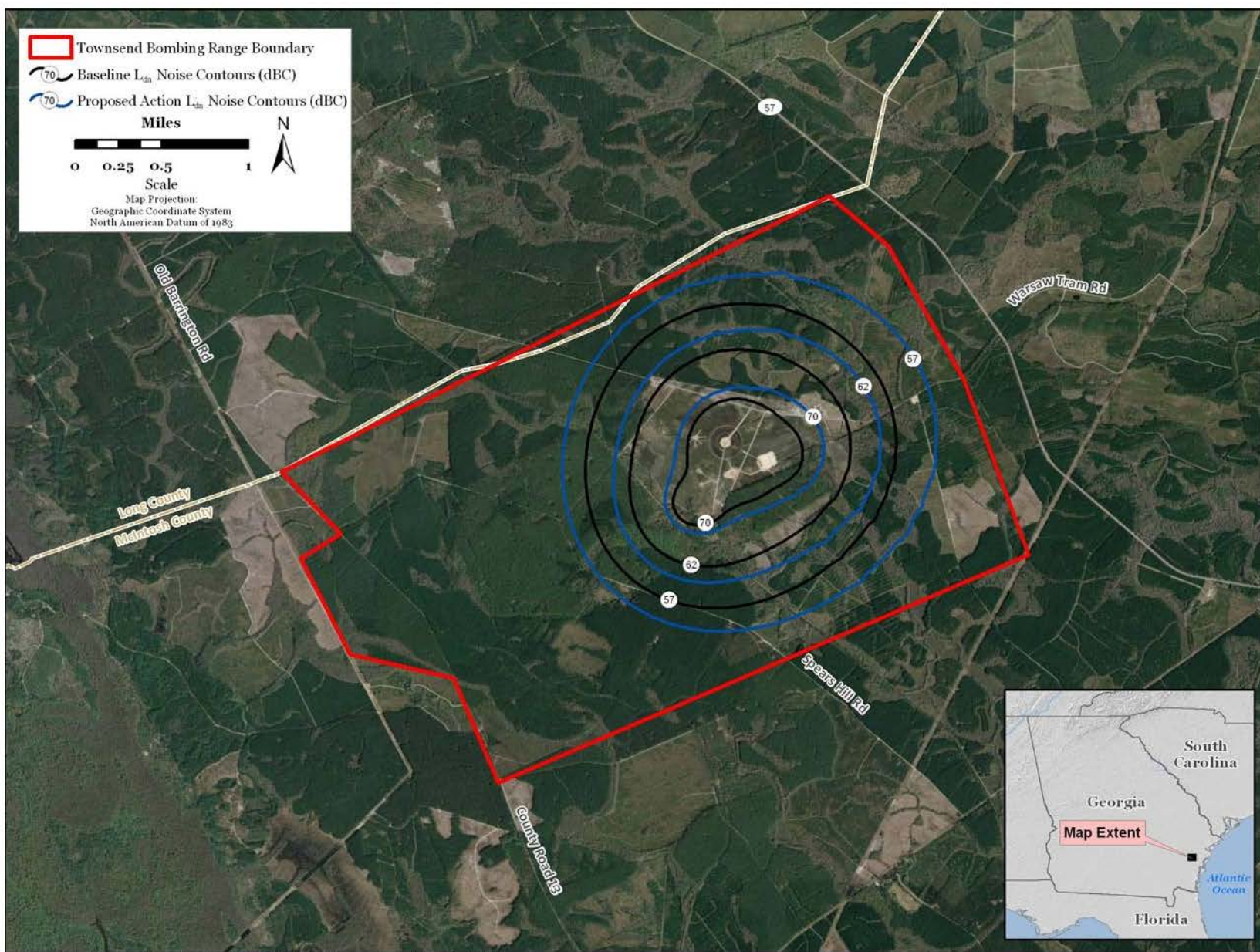
The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, “labels,” and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, and the duration of a proposed activity and its “permanence.”

3.4.2 Description of the Affected Environment

Moody AFB encompasses 10,843 acres in Lowndes and Lanier counties in southern Georgia. The largest airspace area analyzed in this EA is the Moody LATN area, which extends north to approximately 79 miles northeast of the City of Atlanta, Georgia; extends west to the border between Alabama and Florida, approximately 34 miles northeast of the City of Pensacola, Florida; extends south to approximately 52 miles west of the City of Gainesville, Florida; and extends east into the Atlantic Ocean approximately 130 miles southeast of Savannah, Georgia. Please see **Appendix A** for a general location map and maps for each MOA, Restricted Area, and LATN area included under the Proposed Action. The ROI includes portions of 169 counties: 121 in Georgia, 29 in Florida, 15 in Alabama, and 4 in South Carolina (see **Appendix E**).



Sources: Noise Contour and Range Location: HDR/je*M 2010; Aerial Imagery: Microsoft Virtual Earth 2009

Figure 3-2. Ordnance Noise Contours at Townsend Range

Most of the land underlying the MOAs, Restricted Areas, and the LATN area is undeveloped and is classified as forested or agricultural with some woody wetland (USGS 2001). As shown in **Table 3-12** and **Appendix A**, 23 urban clusters (i.e., areas with populations between 2,500 and 50,000) underlie the MOAs and the airspace associated with Grand Bay Range. The airspace associated with Townsend Range does not overlie any urban clusters. A total of 152 urban clusters underlie the LATN area, however since the noise level for the LATN area under the baseline and Proposed Action conditions is less than the 65 dBA L_{dnmr} threshold required for land use planning (see **Section 3.3.3**), these urban clusters are not shown in **Table 3-12**.

The Moody LATN area is 85,000 square NMs and covers a small amount of southern South Carolina, portions of southeastern Alabama, the majority of Georgia, and portions of northern Florida. It overlies nine urbanized areas (i.e., areas with populations greater than 50,000) as shown in **Table 3-13** and **Appendix A** (see **Figure A-14**), which are classified as developed medium-intensity or developed high-intensity (USGS 2001). As shown in **Table 3-13**, the Moody 1 MOA overlies one urbanized area (the City of Valdosta, Georgia). The other eight MOAs and the airspace associated with Grand Bay (RA-3008) and Townsend (RA-3007) ranges do not overlie any urbanized areas.

In addition to the urban land areas discussed above, there are 30 Special Use Land Management Areas (SULMAs) that underlie the Restricted Areas and MOAs. SULMAs are state parks, wildlife management areas, natural areas, national forests, national wildlife refuges (NWRs), and wilderness areas and are listed in **Table 3-14**. No SULMAs underlie the Moody 2 North or Moody 2 South MOAs. The land under the Moody LATN area includes 89 SULMAs; however, since the noise level in the LATN area under baseline and Proposed Action conditions is less than the 65 dBA L_{dnmr} , these SULMAs are not shown in the table.

As shown in **Table 3-14** and **Figure 1-3**, the Banks Lake NWR, administered by the USFWS, is north of Moody AFB. The refuge was established in 1985 for the protection and conservation of the unique environment and migratory and resident wildlife. Banks Lake NWR contains a variety of habitat types including 1,500 acres of marsh, 1,549 acres of cypress swamp, and 1,000 acres of open water. Management of the lake focuses on working cooperatively with the GDNr to promote and maintain a healthy fishery and provide opportunities for appropriate recreational uses by maintaining a boat ramp, dock, boardwalk, and other facilities. A cooperative partnership involving the USFWS, GDNr, the Nature Conservancy, and Moody AFB has focused on developing a Management Plan that benefits the entire Grand Bay/Banks Lake ecosystem (USFWS undated).

Land use can be deemed incompatible with an installation if it adversely affects the utility of training and readiness missions of a military installation, thereby affecting the ability of an installation to fulfill its mission. Therefore, compatible land development is essential to the sustained operation of the military installation. In order to foster a relationship between local governments and Moody AFB and to encourage compatible land use development, a Joint Land Use Study (JLUS) was prepared (SGRDC 2009). The JLUS was prepared in cooperation with the South Georgia Regional Development Center, and Berrien, Lanier, Lowndes, Clinch, and Echols counties. The Moody AFB JLUS identifies incompatibilities in terms of land use and growth trends for the five-county region and includes recommended policies and actions that Moody AFB and surrounding local governments should consider adopting as useful tools to manage the growth of their communities and Moody AFB in a sound and sustainable manner (SGRDC 2009). The JLUS only considers land immediately surrounding Moody AFB and does not address all of the airspace considered under the Proposed Action.

Table 3-12. Urban Clusters Underlying R-3008C and MOAs

Underlying Urban Clusters	2009 Population	State	Airspace Areas
Lakeland	2,671	Georgia	Moody 1 MOA and R-3008C (associated with Grand Bay Range)
Adel	5,404	Georgia	Moody 1 MOA
Ashburn	4,232		
Cordele	11,498		
Fitzgerald	9,104		
Moultrie	15,500		
Nashville	4,817		
Ocilla	3,125		
Quitman	4,345		
Sylvester	5,751		
Tifton	17,410		
Homerville	2,681	Georgia	Moody 1 and Moody 2 North MOAs
Blakely	5,176	Georgia	Moody 3 MOA
Live Oak	7,169	Florida	Live Oak MOA
Louisville	2,711	Georgia	Bulldog A and B MOAs
Sandersville	6,097		
Millen	3,381	Georgia	Bulldog B MOA
Swainsboro	7,679		
Waynesboro	5,793		
Hinesville	30,704	Georgia	Coastal 1 East MOA
Walthourville	3,958		
Jesup	10,399	Georgia	Coastal 1 West MOA

Source: U.S. Census Bureau 2011

Table 3-13. Urbanized Areas Underlying the Moody 1 MOA and Moody LATN Area

Underlying Urbanized Areas	2009 Population	State	Airspace Area
Valdosta	52,169	Georgia	Moody 1 MOA
Dothan	67,525	Alabama	LATN Area
Jacksonville	813,518	Florida	
Tallahassee	172,574		
Albany	75,616	Georgia	
Athens	114,983		
Columbus	185,781		
Macon	92,582		
Savannah	134,699		
Warner Robins	62,026		

Source: U.S. Census Bureau 2011

**Table 3-14. Special Use Land Management Areas
Underlying the Restricted Areas and MOAs**

Special Land Use Management Area (SULMA)	City	State	Overlying Airspace Areas
Banks Lake National Wildlife Refuge	Near Lakeland	Georgia	Moody 1 MOA R-3008B and C (associated with Grand Bay Range)
Grand Bay Wildlife Management Area	Moody AFB		
Doerun Pitcherplant Bog Natural Area	Doerun	Georgia	Moody 1 MOA
Georgia Veterans Memorial State Park	Cordele		
Jefferson Davis Memorial Park	Fitzgerald		
Reed Bingham State Park	Adel		
Mayhaw Wildlife Management Area	Colquitt	Georgia	Moody 3 MOA
Elmodel Wildlife Management Area	Newton		
George T. Bagby State Park	Fort Gaines		
Kolomoki Mounds State Park	Blakely	Georgia	Moody 3 MOA
Lake Walter F. George Wildlife Management Area	North of Fort James		
Ichetucknee State Park	Fort White	Florida	Live Oak MOA
Lower Suwannee National Wildlife Refuge	Chiefland		
Suwannee River State Park	Ellaville/Live Oak		
Big Duke Pond Natural Area	near Millen	Georgia	Bulldog A and B MOAs
Di-Lane Wildlife Management Area	Waynesboro		
George L. Smith State Park	Twin City	Georgia	Bulldog B MOA
Magnolia Springs State Park	Millen		
Ochoopee Dunes Natural Area	Swainsboro		
Yuchi Wildlife Management Area	Waynesboro		
Griffin Ridge Wildlife Management Area	Ludowici	Georgia	Coastal 1 East MOA
Jerico River Natural Area	Richmond Hill		
Richmond Hill Wildlife Management Area	Richmond Hill		
Little Satilla Wildlife Management Area	Patterson	Georgia	Coastal 1 West MOA
Rayonier Wildlife Management Area	Jesup		

Special Land Use Management Area (SULMA)	City	State	Overlying Airspace Areas
Altamaha-Rayonier Natural Area	Darien	Georgia	Coastal 1 East MOA R-3007 (associated with Townsend Range)
Townsend Wildlife Management Area	Darien		
Altamaha Wildlife Management Area	Darien	Georgia	Coastal 1 East MOA Coastal 1 West MOA R-3007 (associated with Townsend Range)
Penholoway Swamp Wildlife Management Area	Darien		
Sansavilla Wildlife Management Area	Brunswick		

3.4.3 Environmental Consequences

Evaluation Criteria

The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be significant if any of the following were to happen:

- Be inconsistent or in noncompliance with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

Guidelines for areas exposed to large-caliber weapons noise include the following (USACHPPM 2005):

- *57 to 62 dBC L_{dn} .* Land within the 57 to 62 dBC L_{dn} noise zone is usually acceptable for all types of land use activities. However, for planning purposes, these contours are plotted to provide the installation with an adequate buffer for land use planning and can reduce conflicts between the installation's noise-producing activities and the civilian community.
- *62 to 70 dBC L_{dn} .* Land within the 62 to 70 dBC L_{dn} noise zone should normally be limited to activities such as industrial, manufacturing, transportation, and resource production. However, if the community determines that land within the 62 to 70 dBC L_{dn} noise zone must be used for residential purposes, then noise-level reduction features of 25 to 30 decibels should be incorporated into the design and construction of new buildings.
- *Greater than 70 dBC L_{dn} .* The noise levels within the greater than 70 dBC L_{dn} noise zone are considered so severe that noise-sensitive land uses should not be considered therein.

Proposed Action

Aircraft Sortie-Operations. The Proposed Action would not involve changes in land use and would not preclude the viability of existing land use. The number of events per month above 65 dBA SEL would

remain the same as under baseline conditions for the MOAs, ranges, and LATN area, with the exception of the Moody 2 North MOA. As discussed in **Section 3.3.3**, the number of events per month above 65 dBA SEL in the areas underlying the Moody 2 North MOA would decrease under the Proposed Action. It is expected that the events per month above 65 dBA SEL under the Proposed Action would continue to have a negligible long-term impact on the areas underlying the MOAs, ranges, and LATN area.

As discussed in **Section 3.3.1**, sound levels below 65 dBA L_{dnmr} are considered compatible with all land uses. There would not be an increase in estimated noise levels greater than 65 dBA L_{dnmr} from aircraft operations in any of the airspace analyzed under the Proposed Action with the exception of R-3008A associated with Grand Bay Range. As a result, the Proposed Action would not be incompatible with the existing land use under the airspace areas analyzed with the exception of the land underlying R-3008A. The noise level in R-3008A (approximately 69.6 dBA L_{dnmr}) would exceed the threshold of 65 dBA L_{dnmr} required for land use planning.

According to the 2009 JLUS, land that underlies R-3008A is primarily rural in nature and consists mostly of undeveloped wetland areas (SGRDC 2009). Undeveloped land is considered compatible with noise levels of 70 to 74 dBA L_{dnmr} (Moody AFB 1994). Approximately 22 to 36 percent of persons exposed on a long-term basis to 70 to 74 dBA L_{dn} are expected to be annoyed by such noise events. However, a review of 2010 aerial photography shows no residences underlying R-3008A. Therefore, long-term, negligible to minor, adverse impacts on the land underlying R-3008A would be expected as a result of the aircraft noise under the Proposed Action.

Under the Proposed Action, Moody AFB aircrews would use flares in the Moody 2 North and South MOAs. Flares burn for 3 to 5 seconds at a temperature in excess of 2,000 degrees Fahrenheit to simulate a jet exhaust. During the burn, a flare descends between 200 and 400 feet. The burning magnesium pellet is consumed, and four or five plastic pieces and aluminum-coated Mylar wrapping material falls to the ground (Moody AFB 2006). The majority of flare materials that fall to the ground would not produce impacts.

The potential for a flare to strike a person was estimated within the Moody 2 North and South MOAs. The number of proposed flares in each MOA is 5,000 annually. The potential for a flare strike was calculated by the number of flares, the momentum of the components, and the number of estimated people per square mile (see **Appendix H**). The number of people within each MOA was estimated from 2010 census data. Within Moody 2 North MOA there are an estimated 54.14 people per square mile.; in Moody 2 South MOA there are an estimated 15.76 people per square mile. In the Moody 2 North MOA, the potential for a flare to strike a person was estimated at 0.004 per year. The potential for a strike under the Moody 2 South MOA was estimated at 0.001 per year. Given that the potential for a flare to strike a person is very low, long-term, negligible to minor, adverse impacts would be expected as a result of the proposed flare use.

Ordnance Use. As shown in **Table 3-15**, the acreage within the noise contours from ordnance use at Townsend Range would increase by 41 percent. However, as shown on **Figure 3-2**, the noise contours under baseline and Proposed Action conditions are within the range boundary. Therefore, there would continue to be no impacts on land use outside the Townsend Range boundary under the Proposed Action.

No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions. Aircraft operations at Moody AFB would remain unchanged in the associated airspace; therefore, no impacts on land use under the No Action Alternative are expected.

Table 3-15. Ordnance Noise Contour Acreages at Townsend Range

Noise Zone (L_{dn})	Acreage		
	<i>Baseline</i>	<i>Proposed Action</i>	<i>Percent Change</i>
57–62 dBC	786	1,102	40%
62–70 dBC	555	760	37%
70+ dBC	233	358	54%
Total	1,574	2,220	41%

3.5 Socioeconomic Resources and Environmental Justice

3.5.1 Definition of the Resource

Socioeconomics. Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly characteristics of population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic indicators typically include employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators are typically accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment identifies gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the “before” and “after” effects of any jobs created or lost as a result of a proposed action. Data on industrial or commercial growth or growth in other sectors provide baseline and trend line information about the economic health of a region.

In appropriate cases, data on an installation’s expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base.

Demographics identify the population levels and changes to population levels of a region. Demographics data might also be obtained to identify, as appropriate to evaluation of a proposed action, a region’s characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

Socioeconomic data shown in this chapter are presented at census tract, municipality, county, and state levels to characterize baseline socioeconomic conditions in the context of regional and state trends. Data have been collected from previously published documents issued by Federal, state, and local agencies; and from state and national databases (e.g., U.S. Bureau of Economic Analysis’ Regional Economic Information System).

Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (11 February 1994) requires Federal agencies’ actions substantially affecting human health or the environment not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO ensures the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income

with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies.

3.5.2 Description of the Affected Environment

Socioeconomics. Moody AFB has approximately 5,500 military and civilian personnel and contributes approximately \$116 million annually to the local economy through payroll expenditures. Additional expenditures of \$30 million are contributed to the local economy through service contracts and another \$7 million through local purchases. Approximately \$153 million is contributed annually to the southeastern Georgia economy by Moody AFB.

From 2000 to 2009 the populations in Lowndes and Lanier counties each grew approximately 16 percent. According to the U.S. Census Bureau Lowndes County grew from 92,115 persons in 2000 to 106,814 persons in 2009 while Lanier County grew from 7,241 persons in 2000 to 8,423 persons in 2009. The growth rates for Lowndes County and Lanier County from 2000 to 2008 were less than the growth rate for the State of Georgia which was 20 percent over the same time period (U.S. Census Bureau 2011). Population data are presented in **Table 3-16**.

Table 3-16. Population in Lowndes and Lanier counties and the State of Georgia, 2000 and 2009

	2000	2009	Percent Change
Lowndes County	92,115	106,814	16.0
Lanier County	7,241	8,423	16.3
State of Georgia	8,186,453	9,829,211	20.1

Source: U.S. Census Bureau 2011

As of December 2009, the State of Georgia had a 10 percent unemployment rate compared to an 8.5 percent unemployment rate for the Valdosta metropolitan area (BLS 2009). The Valdosta Metropolitan area includes Brooks, Echols, Lanier, and Lowndes counties. The 2006 gross state product of Georgia was approximately \$215,128 billion (Baer 2008). **Table 3-17** presents employment types in Lowndes and Lanier counties and in the State of Georgia. There is a higher percentage of persons employed in the Armed Forces in Lowndes County (4 percent) and Lanier County (2 percent) than in the State of Georgia (1 percent). Education, health, and social services is the largest employer in Lowndes and Lanier counties and in the State of Georgia. The second largest industry in Lowndes County is the retail trade industry followed by the manufacturing industry. The manufacturing industry is the second largest industry in Lanier County and the State of Georgia. The construction industry is the third largest industry in Lanier County while the retail trade industry is the third largest in the State of Georgia (U.S. Census Bureau 2000).

Environmental Justice. As discussed in **Section 3.3.1**, noise levels below a 55 dBA L_{dn} have been identified by the USEPA as adequate to protect human health and welfare with an adequate margin of safety (USEPA 1974). For the purposes of the socioeconomic and environmental justice analysis, census tracts underlying airspaces with an increase above the 55 dBA L_{dnmr} values from **Table 3-10** will be evaluated as part of the study area for this EA. These airspaces include R-3008A, R-3008 B-D, and Moody 2 South MOA. The affected census tracts underlying R-3008A are 9502.00 and 101.02. The Census Tracts underlying R-3008 B-D are 9501.00, 9502.00, 9802.00, 101.02, and 107.00. The census tracts underlying Moody 2 South MOA are 9501.00, 9701.00, 9702.00, 9801.00, 9802.00, and 9903.00.

Table 3-17. Employment Type in Lowndes County, Lanier County, and the State of Georgia

Economic and Social Indicators	Lowndes County	Lanier County	State of Georgia
Employed Persons in Armed Forces	4.1%	2.0%	1.1%
Agriculture, forestry, fishing and hunting, and mining	1.5%	5.2%	1.4%
Construction	6.6%	12.1%	7.9%
Manufacturing	11.8%	17.6%	14.8%
Wholesale trade	3.5%	2.4%	3.9%
Retail trade	15.8%	11.3%	12.0%
Transportation and warehousing, and utilities	5.4%	6.6%	6.0%
Information	2.3%	0.4%	3.5%
Finance, insurance, real estate, and rental and leasing	4.2%	2.3%	6.5%
Professional, scientific, management, administrative, and waste management services	6.6%	5.2%	9.4%
Educational, health and social services	23.3%	18.4%	17.6%
Arts, entertainment, recreation, accommodation and food services	8.8%	8.5%	7.1%
Other services (except public administration)	4.5%	3.8%	4.7%
Public administration	5.6%	8.2%	5.0%

Source: U.S. Census Bureau 2000

Table 3-18 displays aggregated numbers for the census tracts underlying the applicable Restricted Areas and MOA. Both areas underlying the Restricted Areas and the area underlying the Moody 2 South MOA have per capita and median household incomes that are lower than the average for the State of Georgia. Minority populations residing under the Restricted Areas are less than or very similar to the minority populations for the State of Georgia. Poverty levels under R-3008A and R-3008B-D (4 percent and 9 percent respectively) are less than the State of Georgia (13 percent); whereas, the percent of individuals living in poverty in the census tracts underlying Moody 2 South MOA is approximately 27 percent, which is markedly higher than the 13 percent reported for the State of Georgia (U.S. Census Bureau 2000). In the census tracts underlying the Moody 2 South MOA, the minority population percentages are similar to or less than the State of Georgia, but the Hispanic population percentage is higher (6 percent for the Moody 2 South MOA versus 5 percent for the State of Georgia) and the population reporting as some other race is also higher (4 percent for the Moody 2 South MOA versus 2 percent for the State of Georgia) (U.S. Census Bureau 2000).

3.5.3 Environmental Consequences

Evaluation Criteria

Socioeconomic impacts are assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates 10 employment positions might go unnoticed in an urban area, but could have considerable impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or a decrease in regional spending or earning patterns, they would be considered adverse. The Proposed Action could have a significant effect with respect to the socioeconomic conditions in the surrounding ROI if it were to result in the following:

Table 3-18. Race and Poverty Characteristics, 2000

Economic and Social Indicators*	R-3008A (Grand Bay Range)	R-3008 B-D (Grand Bay Range)	Moody 2 South MOA	State of Georgia
Total Population	12,900	19,782	2,526	8,186,453
Percent White	70.5	73.0	62.8	65.1
Percent Black or African American	24.3	20.7	19.8	28.7
Percent American Indian Alaska Native	0.6	0.5	1.0	0.3
Percent Asian	1.2	0.9	0.3	2.1
Percent Native Hawaiian and Other Pacific Islander	0.1	0.1	0.0	0.1
Percent Some Other Race	1.5	3.1	4.0	2.4
Percent Reporting 2 or More Races	1.9	1.5	0.5	1.4
Percent Hispanic	3.6	5.6	6.0	5.3
Percent Individuals below Poverty Level	3.6	9.4	26.9	13.0
Per Capita Income	\$17,923	\$14,768	\$13,772	\$21,154
Median Household Income	\$37,407	\$31,800	\$25,472	\$42,433

Source: U.S. Census Bureau 2000

Note: * Census 2000 data are the most recent data available for census tracts.

- Change the local business volume, employment, personal income, or population that exceeds the ROI's historical annual change
- Adversely affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates
- Disproportionately affect minority populations, low-income populations, or children.

For the purposes of this EA, ethnicity and poverty data are examined for the area underlying the ranges and airspaces that could be impacted and compared to the State of Georgia to determine if a low-income or minority population could be disproportionately affected by the Proposed Action. For this analysis, data from the U.S. Census Bureau are used to define minority populations (individuals who are Black/African-American, Asian, Pacific Islander, American Indian, Eskimo, Aleut, or other nonwhite persons (a separate distinction has been made for people of Hispanic origin)).

Proposed Action

Socioeconomics. Socioeconomic indicators under the Proposed Action would remain largely unchanged. There are no planned personnel increases, expenditures, or construction as part of the Proposed Action. As a result, no effects on socioeconomic resources and economic indicators are expected.

Environmental Justice. Disproportionate impacts on minority, low-income populations or children would not occur as a result of the Proposed Action. Under the Proposed Action, noise levels over the 55 dBA L_{dnmr} occur only in Moody 2 South MOA, R-3008A, and R-3008B-D, see **Table 3-10**. For those airspaces that do not exceed 55 dBA L_{dnmr} , no impacts would be expected; therefore, impacts on minority and low-income populations would not occur. Grand Bay Range is contained entirely within the

boundary of Moody AFB and does not have the potential for an environmental justice impact on the underlying populations. Noise levels in R-3008B, C, and D would increase from 59.4 dBA to 64.0 dBA L_{dnmr} . The census tracts underlying R-3008 B, C, and D do not contain a higher percentage of minority populations than the State of Georgia. Census block group 2, which is within and south of the City of Lakeland, contains a higher percentage of minority populations. This is the only census block group within R-3008 B, C, and D where the minority population is high. However, aircraft currently do not and would not fly more often over the populations within census block group 2 than the rest of the block groups within R-3008. Therefore, disproportionate impacts on minority populations would not be expected.

The percentage of individuals living in poverty in census tracts underlying R-3008 B, C, and D is less than the percentage of individuals living in poverty for the State of Georgia. The percentage of children living in the census tracks is not significantly higher than the percentage of children in the State of Georgia. In addition, aircraft are currently training within R-3008 B, C, and D. Under the Proposed Action, aircraft training patterns are not expected to change. Therefore, disproportionate impacts on low-income populations and children would not be expected.

The populations underlying the Moody 2 South MOA contain slightly a higher percent of Hispanic populations, and low-income populations in comparison to the State of Georgia. Noise levels in Moody 2 South MOA were estimated at 57.7 dBA L_{dnmr} , which is an increase of 2.7 dBA over the USEPA's guidelines. The noise levels at the Moody 2 South MOA would not significantly impact populations underlying the MOA; therefore, disproportionate impacts on minority or low-income populations would not be expected.

Noise impacts associated with increased ordnance use under the Proposed Action would not result in any environmental justice concerns. There are no people residing within the Townsend Range, therefore, there would be no potential for impacts as the increased noise levels would be contained entirely within the range.

No Action Alternative

The No Action Alternative would result in continuation of the existing socioeconomic and environmental conditions. No additional effects on socioeconomics or environmental justice would be expected as a result of the Proposed Action not being implemented.

3.6 Cultural Resources

3.6.1 Definition of the Resource

“Cultural resources” is an umbrella term used for many heritage-related resources defined in a number of laws and executive orders.

These Federal cultural resources laws and regulations include the National Historic Preservation Act (NHPA) (1966), the Archaeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (NAGPRA) (1990).

The NHPA focuses on cultural resources such as prehistoric and historic sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. Such resources might provide insight into the cultural practices of previous civilizations or they might retain cultural and religious significance to modern

groups. Resources that are judged to be important under the NHPA are determined eligible for or listed in the National Register of Historic Places (NRHP). They are termed “historic properties” and are provided some level of protection under the NHPA.

NAGPRA requires consultation with culturally affiliated Native American tribes for the disposition of Native American human remains, burial goods, and cultural items recovered from Federal or federally controlled lands.

Typically, cultural resources are subdivided into archaeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing); architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance); and resources of traditional, religious, or cultural significance to Native American tribes.

Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., projectile points and bottles).

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for the NRHP. More recent structures, such as Cold War-era resources, might warrant protection if they are of exceptional importance or if they have the potential to gain significance in the future.

Resources of traditional, religious, or cultural significance to Native American tribes can include archaeological resources, sacred sites, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans consider essential for the preservation of traditional culture.

The EA process requires an assessment of the potential impact of a Federal action on cultural resources, and the consultation process prescribed in Section 106 of the NHPA requires a determination of the effect of a Federal undertaking on historic properties within the proposed undertakings’ Area of Potential Effect (APE). The APE is defined as the geographic area(s) “within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” Under Sections 106 and 110 of the NHPA, Federal agencies are required to locate and inventory all cultural resources under their purview that are recommended as eligible for inclusion in the NRHP on federally owned, leased, or managed property. The Federal agency official evaluates the NRHP eligibility and assesses potential effects of an undertaking on historic properties in consultation with the SHPO. If historic properties could be affected by the undertaking, the Federal agency official is required to provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment in accordance with 36 CFR Part 800.

3.6.2 Existing Conditions

Moody AFB was established in 1941 and currently encompasses approximately 10,843 acres of federally owned land. The entire Main Base Cantonment area and the Grand Bay Range have been surveyed for cultural resources and 300 cultural resources have been identified (Azzarello et al. 2006). Cultural resources include 23 archaeological sites, 39 isolated archaeological finds, and 234 Cold War-era and older buildings and structures. Currently, no resources of traditional, religious, or cultural significance to Native American tribes have been identified within the boundaries of Moody AFB.

Archaeological resources at Moody AFB include 14 sites on the Main Base and nine sites on Grand Bay Range. Five sites were recommended to be potentially eligible during an initial investigation for the

NRHP including three sites on the Main Base (9LN17, 9LW71, 9LW63) and two sites on Grand Bay (9LW52, 9LW67). One site on the Main Base was determined Not Eligible (9LN17) and one was determined eligible (9LW71). Of the Isolated Finds, 10 were recorded on the Main Base and the remaining 29 occur on Grand Bay Range (Thackston 2009).

Architectural resources are mostly in Moody's Cantonment area and include 189 Cold War-era (1946 to 1989) structures and buildings and 45 structures and buildings that meet the National Park Service's minimum age (50 years) guideline for NRHP eligibility. Currently, only one architectural resource, Structure 618 (LW-M-3), a water tower, has been recommended eligible for listing to the NRHP.

Townsend Range is owned by the Marine Corps Air Station (MCAS) Beaufort and covers approximately 5,182 acres in McIntosh County, Georgia. Townsend Range is approximately 130 miles east-northeast of Moody AFB and is routinely used by various military services including aircrews from Moody AFB for bombing and fighter pilot air combat training. The 2006 BRAC EA states that the entire Townsend Range has been surveyed for cultural resources and that 14 archaeological sites are known to occur within its boundaries. Twelve sites are prehistoric lithic ceramic scatters and two are historical sites dating to the 19th and 20th century. Although specific details are not provided, the 2006 BRAC EA concludes that Phase II site evaluations have been conducted at all potentially eligible sites within the range and that the study has determined that none of the sites were eligible for the NRHP (Moody AFB 2006).

No formal record search has been undertaken to determine the number or type of cultural resources encompassed within the 12 airspace units. This combined area includes a large portion of southern Georgia, northern Florida, southeastern Alabama, and southern South Carolina. Based on the 2006 BRAC EA, estimates of cultural resources underlying the affected airspace gathered from state archaeological files could number in the thousands. The National Register Information System lists a total of 95 NRHP-listed structures underlying the affected airspace. Moody 1 MOA has the largest number of NRHP-listed properties with 64, followed by Live Oak MOA with 11, Moody 3 MOA with 10, and Moody 2 North MOA with 3; no listed properties occur under Moody 2 South MOA. Seventeen known American Indian traditional cultural resource sites are present throughout the State of Georgia. However, none of these sites are under or near any of the affected airspace (Moody AFB 2006).

3.6.3 Environmental Consequences

Evaluation Criteria

Adverse impacts on cultural resources can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

For this Proposed Action, the most relevant potential effects on cultural resources would be related directly to perceptible increases of noise that would affect the setting or use of the resource and increased damage or destruction of cultural resources in bombing ranges from increased weapons drop practice of the additional sorties.

Proposed Action

The Proposed Action involves the expansion of sortie-operations within existing airspace components and a corresponding weapons expenditure rate increase on an existing range. The number of sortie-operations

is projected to increase from 37,158 to 52,426. The APE of the Proposed Action encompasses a portion of the 12 airspace units within which additional noise from the increase in sortie-operations would be perceptible. The 12 airspace units encompass a large portion of the southeast including central and southern Georgia, northern Florida, southeastern Alabama, and southern South Carolina. As discussed in **Section 3.3.3**, long-term, intermittent, minor, adverse impacts on the noise environment would be expected as a result of the aircraft noise associated with the Proposed Action. Given the slight increase in noise levels, no significant impacts on architectural resources from aircraft noise are expected from the Proposed Action.

Potential impacts on architectural resources include impacts resulting from increased noise levels. Numerous architectural resources occur at Moody AFB; however, only one historic structure, a water tower built in 1941, has been recommended eligible for listing to the NRHP. In general, many World War II- and Cold War-era structures and buildings at Moody AFB were constructed for aircraft operations, which by nature involve the same impacts expected as part of the Proposed Action. Accordingly, no significant impacts on architectural resources from the Proposed Action are expected.

While 14 archaeological sites are present within Townsend Range, none of these sites are eligible or potentially eligible for the NRHP. Therefore, no significant impacts on archaeological resources at Townsend Range would be expected from the Proposed Action.

No Action Alternative

Under the No Action Alternative, the proposed expansion of sortie-operations within existing airspace and a corresponding weapons expenditure rate increase on the existing ranges would not occur. Baseline conditions for cultural resources as described **Section 3.6.1** would remain unchanged. Therefore, no impacts on cultural resources would occur as a result of the implementation of the No Action Alternative.

3.7 Air Quality

3.7.1 Definition of the Resource

The air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm), micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), or milligrams per cubic meter (mg/m^3).

The Clean Air Act (CAA) directed USEPA to develop National Ambient Air Quality Standards (NAAQS) for pollutants that have been determined to affect human health and the environment. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}] and particulates equal to or less than 2.5 microns in diameter [$\text{PM}_{2.5}$]), and lead (Pb). The primary NAAQS are ambient air quality standards to protect the public health; secondary NAAQS specify levels of air quality to protect the public welfare such as effects on vegetation, crops, wildlife, economic values, and visibility.

The states of Georgia, Florida, Alabama, and South Carolina, which would potentially be affected by the Proposed Action, have adopted the NAAQS for most criteria pollutants. However, each state has identified certain criteria pollutants to have stricter state ambient air quality standards. **Table 3-19** presents the primary and secondary USEPA NAAQS and the state ambient air quality standards.

Table 3-19. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	National Standard		Georgia	Florida	Alabama	South Carolina
		Primary	Secondary				
O ₃	1 Hour ^a	None	Same as Primary Standard	Same as National	0.12 ppm (235 µg/m ³)	Same as National	0.12 ppm (235 µg/m ³)
	8 Hours ^b	0.08 ppm (157 µg/m ³)		Same as National	None	Same as National	Same as National
	8 Hours	0.075 ppm ^g		Same as National	None	Same as National	Same as National
PM ₁₀	24 Hours ^c	150 µg/m ³	Same as Primary Standard	Same as National	Same as National	Same as National	Same as National
	Annual Arithmetic Mean ^d	None		50 µg/m ³	50 µg/m ³	Same as National	50 µg/m ³
PM _{2.5}	24 Hours ^e	35 µg/m ³	Same as Primary Standard	Same as National	None	Same as National	Same as National
	Annual Arithmetic Mean ^f	15 µg/m ³		Same as National	None	Same as National	Same as National
CO	8 Hours ^c	9.0 ppm (10 mg/m ³)	None	Same as National	Same as National	Same as National	Same as National
	1 Hour ^c	35 ppm (40 mg/m ³)		Same as National	Same as National	Same as National	Same as National
NO ₂	Annual Arithmetic Mean	0.053 ppm (100 µg/m ³)	Same as Primary Standard	Same as National	Same as National	Same as National	Same as National
SO ₂	Annual Arithmetic Mean	0.030 ppm (80 µg/m ³)	None	Same as National	0.02 ppm (60 µg/m ³)	Same as National	Same as National
	24 Hours ^c	0.14 ppm (365 µg/m ³)	None	Same as National	0.1 ppm (260 µg/m ³)	Same as National	Same as National
	3 Hours ^c	None	0.5 ppm (1,300 µg/m ³)	Same as National	Same as National	Same as National	Same as National

Pollutant	Averaging Time	National Standard		Georgia	Florida	Alabama	South Carolina
		Primary	Secondary				
Pb	Quarterly Average	1.5 µg/m ³	Same as Primary Standard	Same as National	Same as National	None	Same as National

Sources: USEPA 2008, State of Florida 2008, State of Georgia 2006, ADEM 1989, SCDHEC 1997

Notes:

Parenthetical values are approximate equivalent concentrations.

- a. The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1 . As of 15 June 2005, USEPA revoked the 1-hour ozone standard in all areas except 14 8-hour ozone nonattainment Early Action Compact Areas.
- b. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
- c. Not to be exceeded more than once per year.
- d. To attain this standard, the expected annual arithmetic mean PM₁₀ concentration at each monitor within an area must not exceed 50 µg/m³.
- e. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³.
- f. To attain this standard, the 3-year average of the annual arithmetic mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.
- g. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective 27 May 2008).

The USEPA designates any area that does not meet the national primary or secondary ambient air quality standard for a criteria pollutant as a nonattainment area. For O₃, each designated nonattainment area is classified as marginal, moderate, serious, severe, or extreme, based on ambient O₃ concentrations. In Georgia, the Air Protection Branch of the GDNr has responsibility for regulation of the Federal CAA. In Florida, the Florida Department of Environmental Protection (FDEP) has responsibility. In Alabama, the Alabama Department of Environmental Management (ADEM) has responsibility, and in South Carolina, the South Carolina Department of Health and Environmental Control (SCDHEC) has this responsibility.

These programs are detailed in State Implementation Plans (SIPs), which are required to be developed by each state's regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the nonattainment area into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA. In the states potentially affected by the Proposed Action, USEPA has delegated the authority for ensuring compliance with the NAAQS to the GDNr, FDEP, ADEM, and SCDHEC.

USEPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. All areas within each AQCR are therefore designated as either "attainment," "nonattainment," "moderate nonattainment," "maintenance," or "unclassified" for each of the seven criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS. Nonattainment indicates that criteria pollutant levels exceed NAAQS. Moderate nonattainment indicates that an area is in nonattainment, but the values for the pollutant are not considered to be serious, severe, or extreme. Maintenance indicates that an area was previously designated nonattainment but is now in attainment. Unclassified means that there is not enough information to appropriately classify an AQCR, so the area is considered in attainment.

Federal Prevention of Significant Deterioration (PSD) regulations designate areas nationwide based on their air quality status relative to the NAAQS. PSD areas are categorized as Class I, II, or III. The classification of an area determines the maximum increase in pollutant concentrations, or "increment" of air quality deterioration, allowed over a baseline air quality concentration. Class I areas have the smallest increments and therefore allow the least amount of air quality deterioration. Class I areas are generally locations that have remained untouched by industry, such as parks or wilderness areas. Conversely, Class III areas have the largest air quality increments and allow the greatest deterioration. Regardless of the size of the increment, the NAAQS may not be violated in a PSD area (40 CFR 51 and 52).

Federal PSD regulations also define air pollutant emissions from proposed major stationary sources or modifications to be adverse if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 µg/m³ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)].

3.7.2 Description of the Affected Environment

The Proposed Action involves overflights in 11 AQCRs, as shown in **Table 3-20**. **Appendix E** includes the county and state within which each MOA or range is located. Nine AQCRs under the MOAs and ranges are in attainment/unclassified for all criteria pollutants. Three AQCRs in Georgia overlap the LATN area, and all are in nonattainment for PM_{2.5} and ozone (USEPA 2011). **Table 3-20** lists the AQCRs, including those that are in nonattainment for criteria pollutants.

Table 3-20. AQCRs Potentially Affected by the Proposed Action

State	AQCR	Status	Criteria Pollutant(s)
Alabama	Southeast Alabama Intrastate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Alabama	Alabama and Tombigbee Rivers Intrastate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Alabama and Georgia	Columbus-Phenix City Interstate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Alabama, Florida, and Mississippi	Mobile-Pensacola-Panama City-Southern Mississippi Interstate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Florida and Georgia	Jacksonville-Brunswick Interstate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Georgia	Central Georgia Intrastate	Nonattainment (PM _{2.5}), Maintenance (O ₃)	PM _{2.5} , 8-hour O ₃
		Attainment/Unclassified	PM ₁₀ , CO, NO ₂ , SO ₂ , Pb
Georgia	Metropolitan Atlanta Intrastate	Nonattainment (moderate for ozone)	PM _{2.5} , 8-hour O ₃
		Attainment/Unclassified	PM ₁₀ , CO, NO ₂ , SO ₂ , Pb
Georgia	Northeast Georgia Intrastate	Nonattainment (moderate for ozone)	PM _{2.5} , 8-hour O ₃
		Attainment/Unclassified	PM ₁₀ , CO, NO ₂ , SO ₂ , Pb
Georgia	Southwest Georgia Intrastate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Georgia and South Carolina	Augusta-Aiken Interstate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb
Georgia and South Carolina	Savannah-Beaufort Interstate	Attainment/Unclassified	O ₃ , PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ , Pb

Source: USEPA 2011

The LATN area overlaps the following Federal Class I areas: Okefenokee NWR, Georgia; Wolf Island, Georgia; and Bradwell Bay, Florida. There are other federally protected areas under the LATN area, such as Osceola National Forest, Florida; Apalachicola National Forest, Florida; and Wassaw NWR, Georgia, but these are not considered to be mandatory Class I areas. Several of the MOAs are also above these Class I areas. Because of existing and proposed sortie-operations over Class I areas, PSD regulations are applicable. Refer to **Appendix A** for maps showing these airspace operational areas.

Aircraft-specific data and emissions factors from the U.S. Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis (IERA) publication entitled *Air Emissions Inventory Guidance for Mobile Sources* (USAF IERA 2001) and the USEPA document entitled *Commercial Aircraft 2002* (USEPA 2002) were used to estimate air quality emissions from baseline conditions. Air quality emissions in tons per year (tpy) from baseline operations in the airspace analyzed in this EA are shown in **Table 3-21**. Detailed calculations for air quality emissions from the baseline scenario are provided in **Appendix G**.

Table 3-21. Baseline Emissions Estimates from Sortie-Operations

Flight Operational Area	NO_x (tpy)	VOC (tpy)	CO (tpy)	PM₁₀ (tpy)	SO_x (tpy)
Moody 1 MOA*	0.000	0.000	0.000	0.000	0.000
Moody 2 North MOA	13.053	2.378	32.150	9.779	1.025
Moody 2 South MOA	5.746	0.514	3.839	1.725	0.352
Moody 3 MOA*	0.000	0.000	0.000	0.000	0.000
Live Oak MOA*	0.000	0.000	0.000	0.000	0.000
Bulldog A MOA	2.927	0.431	3.468	1.194	0.146
Bulldog B MOA*	0.000	0.000	0.000	0.000	0.000
Coastal 1 East MOA	36.978	3.544	10.064	14.138	1.574
Coastal 1 West MOA	36.978	3.544	10.064	14.138	1.574
Grand Bay Range	10.103	2.617	42.204	10.659	0.951
Townsend Range	80.179	7.627	20.544	30.412	3.398
LATN Area	28.193	5.651	84.815	22.893	2.356
Total Baseline Emissions	214.16	26.31	207.15	104.94	11.38

Note: * Moody 1 MOA, Moody 3 MOA, Live Oak MOA, and Bulldog B MOA have no operations below 3,000 feet.

3.7.3 Environmental Consequences

The Federal *de minimis* threshold emissions rates were established by USEPA in the General Conformity Rule to focus analysis requirements on those Federal actions with the potential to substantially affect air quality. **Table 3-22** presents these thresholds by regulated pollutant. *De minimis* thresholds vary depending on the severity of the nonattainment area classification.

Long-term, minor, adverse effects on local air quality would be expected to increase slightly as a result of the aircraft emissions associated with the Proposed Action. As shown in **Table 3-20**, only three AQCRs in Georgia are located in Federal moderate nonattainment areas for O₃ and nonattainment areas for PM_{2.5}. These, and all other AQCRs potentially affected by the Proposed Action, are classified as being in attainment/unclassified for all other criteria pollutants. Regulated pollutant emissions from the Proposed Action would not be expected to contribute to or affect local or regional attainment status with the NAAQS.

Table 3-22. Federal General Conformity *de minimis* Emissions Thresholds

Pollutant	Status	Classification	<i>De minimis</i> Limit (tpy)
O ₃ (measured as NO _x or VOCs)	Nonattainment	Extreme Severe Serious Moderate/marginal (inside ozone transport region) All others	10 25 50 50 (VOCs)/100 (NO _x) 100
	Maintenance	Inside ozone transport region Outside ozone transport region	50 (VOCs)/100 (NO _x) 100
CO	Nonattainment/ maintenance	All	100
PM ₁₀	Nonattainment/ maintenance	Serious Moderate Not Applicable	70 100 100
PM _{2.5} (measured directly, as SO ₂ , or as NO _x)	Nonattainment/ maintenance	All	100
SO ₂	Nonattainment/ maintenance	All	100
NO _x	Nonattainment/ maintenance	All	100

Source: 40 CFR 93.153

Evaluation Criteria

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the effects in NAAQS attainment areas would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any Evaluation Criteria established by a SIP.

Effects on air quality in NAAQS nonattainment areas are considered significant if the net changes in project-related pollutant emissions result in any of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Delay the attainment of any standard or other milestone contained in the SIP.

With respect to the General Conformity Rule, effects on air quality would be considered significant if the proposed Federal action would result in an increase of emissions that exceeds *de minimis* threshold levels

established in 40 CFR 93.153(b) for individual nonattainment pollutants or for pollutants for which the area has been redesignated as a maintenance area.

Proposed Action

Aircraft operations at each MOA, Restricted Area, and the LATN area were analyzed using the data shown in **Table 2-1** and **Appendix A**. Only flight operations below the mixing layer (3,000 feet AGL) were evaluated for impacts on local and regional air quality. The mixing layer is an important meteorological parameter that affects near-surface atmospheric pollutant concentrations since it determines the volume of air into which pollutants and their precursors are emitted. Typically, the mixing layer is located around 3,000 feet AGL. Therefore, the amount of time each aircraft spent operating under the 3,000-foot AGL mixing layer was modeled.

Aircraft-specific data and emissions factors from the IERA publication entitled *Air Emissions Inventory Guidance for Mobile Sources* (USAF IERA 2001) and the USEPA document entitled *Commercial Aircraft 2002* (USEPA 2002) were used to estimate air quality emissions from the Proposed Action. Air quality emissions associated with the proposed airspace operations are shown in **Table 3-23**. A detailed description of air quality emissions associated with the Proposed Action is provided in **Appendix G**.

Table 3-23. Proposed Action Emissions Estimates from Sortie-Operations

Flight Operational Area	NO _x (tpy)	VOC (tpy)	CO (tpy)	PM ₁₀ (tpy)	SO _x (tpy)
<i>De minimis</i> Limit (tpy)	10 - 100		100	70 - 100	100
Moody 1 MOA*	0.00	0.00	0.00	0.00	0.00
Moody 2 North MOA	13.18	2.43	32.42	10.11	1.05
Moody 2 South MOA	13.24	2.64	39.95	10.22	1.11
Moody 3 MOA*	0.00	0.00	0.00	0.00	0.00
Live Oak MOA*	0.00	0.00	0.00	0.00	0.00
Bulldog A MOA	3.22	0.54	5.33	1.64	0.18
Bulldog B MOA*	0.00	0.00	0.00	0.00	0.00
Coastal 1 East MOA	37.27	3.65	11.90	14.58	1.61
Coastal 1 West MOA	37.27	3.65	11.90	14.58	1.61
Grand Bay Range	15.56	3.49	54.13	14.03	1.38
Townsend Range	80.47	7.73	22.38	30.86	3.43
LATN Area	28.98	5.71	85.32	23.11	2.40
Total Proposed Action Emissions	229.18	29.85	263.32	119.13	12.77
Proposed Action Net Change	+15.02	+3.54	+56.18	+14.20	+1.39

Note: *Moody 1 MOA, Moody 3 MOA, Live Oak MOA, and Bulldog B MOA have no operations below 3,000 feet.
See **Table 3-22** for detailed information regarding *De minimis* Limits.

As described in **Table 2-2**, an increase in the projected annual ordnance use is expected under the Proposed Action. Emissions from munitions, including flares, were estimated in the 2006 BRAC EA (Moody AFB 2006). Munitions emissions presented in the 2006 BRAC EA were determined to be minimal when compared to regional emissions. Emissions of CO from munitions were below 6.5 tpy and all other criteria pollutants were below 1 tpy each. In addition, munitions emissions (including flare use)

would not occur in nonattainment areas. Therefore, the increased ordnance and flare use associated with the Proposed Action is not expected to cause a significant increase in emissions.

AQCRs in nonattainment that are potentially affected by the Proposed Action are only affected by sortie-operations in the LATN area, as opposed to sortie-operations in any of the MOAs or ranges. **Table 3-24** compares the emissions from baseline conditions with the increase in criteria pollutant emissions from the Proposed Action for all of the AQCRs.

Table 3-24. Estimated Emissions in AQCRs from Aircraft Operations

AQCR	Attainment Status	Description	CO (tpy)	NO _x (tpy)	PM ₁₀ (tpy)	SO _x (tpy)	VOC (tpy)
Central Georgia Intrastate	Nonattainment	Baseline Aircraft Emissions	13.939	5.272	3.855	0.405	1.001
		Proposed Action Aircraft Emissions	14.684	5.495	4.049	0.424	1.049
		Proposed Action Net Change	+0.746	+0.223	+0.194	+0.019	+0.048
Northeast Georgia Intrastate	Nonattainment	Baseline Aircraft Emissions	3.293	1.095	0.889	0.091	0.219
		Proposed Action Aircraft Emissions	3.312	1.125	0.897	0.093	0.222
		Proposed Action Net Change	+0.019	+0.030	+0.008	+0.002	+0.002
Metropolitan Atlanta Intrastate	Nonattainment	Baseline Aircraft Emissions	2.235	0.743	0.603	0.062	0.149
		Proposed Action Aircraft Emissions	2.248	0.764	0.609	0.063	0.151
		Proposed Action Net Change	+0.013	+0.021	+0.006	+0.001	+0.002
Alabama and Tombigbee Rivers Intrastate	Attainment	Baseline Aircraft Emissions	0.024	0.008	0.006	0.001	0.002
		Proposed Action Aircraft Emissions	0.024	0.008	0.006	0.001	0.002
		Proposed Action Net Change	+0.000	+0.000	+0.000	0.000	+0.000
Augusta-Aiken Interstate	Attainment	Baseline Aircraft Emissions	8.210	3.865	2.381	0.260	0.675
		Proposed Action Aircraft Emissions	9.438	4.107	2.684	0.285	0.749
		Proposed Action Net Change	+1.228	+0.242	+0.303	+0.025	+0.074

AQCR	Attainment Status	Description	CO (tpy)	NO_x (tpy)	PM₁₀ (tpy)	SO_x (tpy)	VOC (tpy)
Columbus-Phenix City Interstate	Attainment	Baseline Aircraft Emissions	7.697	2.558	2.077	0.214	0.513
		Proposed Action Aircraft Emissions	7.742	2.630	2.097	0.218	0.518
		Proposed Action Net Change	+0.045	+0.071	+0.020	+0.004	+0.006
Jacksonville-Brunswick Interstate AQCR	Attainment	Baseline Aircraft Emissions	93.350	167.537	70.901	7.950	17.846
		Proposed Action Aircraft Emissions	113.029	170.490	75.973	8.293	18.959
		Proposed Action Net Change	+26.498	+6.475	+6.344	+0.615	+1.610
Mobile-Pensacola-Panama City-Southern Mississippi Interstate	Attainment	Baseline Aircraft Emissions	4.492	1.493	1.213	0.125	0.299
		Proposed Action Aircraft Emissions	4.519	1.535	1.224	0.127	0.303
		Proposed Action Net Change	+0.027	+0.042	+0.011	+0.003	+0.003
Savannah-Beaufort Interstate	Attainment	Baseline Aircraft Emissions	8.560	11.971	5.409	0.589	1.350
		Proposed Action Aircraft Emissions	9.094	12.103	5.545	0.601	1.383
		Proposed Action Net Change	+0.533	+0.132	+0.135	+0.012	+0.033
Southeast Alabama Intrastate	Attainment	Baseline Aircraft Emissions	6.149	2.044	1.660	0.171	0.410
		Proposed Action Aircraft Emissions	6.185	2.101	1.675	0.174	0.414
		Proposed Action Net Change	+0.036	+0.057	+0.016	+0.004	+0.004
Southwest Georgia Intrastate	Attainment	Baseline Aircraft Emissions	60.767	19.031	16.172	1.619	4.023
		Proposed Action Aircraft Emissions	93.052	28.823	24.375	2.485	6.103
		Proposed Action Net Change	+35.170	+10.394	+8.872	+0.927	+2.249

As previously discussed, sortie-operations are currently conducted over and near portions of Federal Class I areas. Based on the low level of increased emissions from the Proposed Action, only minor adverse impacts on regional air quality would be expected to occur within or near any of the Class I areas as a result of the Proposed Action.

For the majority of counties within the ROI, General Conformity Rule requirements are not applicable. General Conformity does not apply to the AQCRs that are in attainment, which includes most of the AQCRs in **Table 3-24**. For those AQCRs that are listed as nonattainment, General Conformity Rule requirements are applicable. However, the emissions for the AQCRs in nonattainment are below *de minimis* thresholds under the Proposed Action, as shown in **Table 3-22**. Therefore, no General Conformity Determination is required.

No Action Alternative

Under the No Action Alternative, long-term, intermittent, minor, adverse impacts on air quality would be expected to continue as a result of the sortie-operations associated with baseline conditions.

3.8 Biological Resources

3.8.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species, and designated or proposed critical habitat; species protected under other Federal laws (e.g., Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act) (see **Appendix B**); and state-listed special concern species.

Under the Endangered Species Act (ESA) (16 U.S.C. 1536), an “endangered species” is defined as any species in danger of extinction throughout all or a significant portion of its range. A “threatened species” is defined as any species likely to become an endangered species in the foreseeable future. The USFWS also maintains a list of species considered to be candidates for possible listing under the ESA. Although candidate species receive no statutory protection under the ESA, the USFWS has attempted to advise government agencies, industry, and the public that these species are at risk and might warrant protection under the Act.

State-protected wildlife species in Georgia are protected under the Georgia Endangered Wildlife Act of 1973. The Rules and Regulations of the GDNR Wildlife Resources Division for the Protection of Endangered, Threatened, Rare, or Unusual Species (Chapter 391-4-10) establish the procedures to be followed in the protection of endangered species, as authorized by this act.

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–712), as amended, and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, require Federal agencies to minimize or avoid impacts on migratory birds. Unless otherwise permitted by regulations, the Migratory Bird Treaty Act makes it unlawful to (or attempt to) pursue, hunt, take, capture, or kill any migratory bird, nest, or egg. If design and implementation of a Federal action cannot avoid measurable negative impacts on migratory birds, EO 13186 directs the responsible agency to develop and implement, within 2 years, a Memorandum of Understanding with the USFWS that shall promote the conservation of migratory bird populations. The Armed Forces are authorized for incidental takes, with limitations, that result from military readiness activities (see **Appendix B**). If any of the Armed Forces determine that a proposed or an ongoing military readiness activity could result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects.

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668c), as amended, which prohibits the “take” of bald or golden eagles in the United States. The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” For purposes of these guidelines, “disturb” means “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause: (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” based on the best scientific information available. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle’s return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

Since the lands underlying the affected airspace would not be subjected to any ground-disturbing activities, vegetation and wetlands found within in the ROI would not be affected by the Proposed Action. Therefore, plant and wetland communities underlying airspace are not discussed in detail.

3.8.2 Description of the Affected Environment

Wildlife and Habitat. As discussed at the beginning of **Section 3**, the ROI for this EA includes the military airspace and ranges discussed in this EA and the land areas directly underneath the airspace areas. However, for the purposes of the Biological Resources analysis, the LATN area is excluded from the ROI. Approximately 85,000 square NMs or 72,041,557 acres underlie the Moody AFB LATN area. Under baseline conditions and the Proposed Action, there would be approximately 26 sortie-operations per day in the LATN area if training occurred 5 days per week. This is equivalent to about 1 sortie-operation per day over every 2,770,829 acres. Given the infrequent occurrence of sortie-operations in the LATN area, it has been excluded from the ROI for Biological Resources.

The ROI lies within the Lower Coastal Plains and Flatwoods section of the Outer Coastal Plain Mixed Forest province. The Outer Coastal Plain Mixed Forest is dominated by temperate rainforest. It differs from the equatorial and tropical rainforest by having fewer species of trees and larger populations of individual species. The area is dominated by pines and lowland hardwoods and supports a wide array of plant and wildlife species typical of these systems (Moody AFB 2008c).

Moody AFB is within the Suwannee River Basin, which discharges to the northeastern Gulf of Mexico. Major drainages in this basin include the Withlacoochee River to the west and the Alapaha River to the east. Characteristic wetland communities on Moody AFB and the surrounding region include emergent marshes, shrub and hardwood swamps, blackgum-cypress swamps, blackwater creek floodplains, and Carolina bays. East of the developed portion of Moody AFB and contained within the Grand Bay Range is an association of major wetlands known as Carolina bays; these make up the Grand Bay/Banks Lake complex (Moody AFB 2006).

Wildlife commonly found underlying the affected ROI are those species typically found in the oak-hickory-pine forests of the Lower Coastal Plains and Flatwoods section of the Outer Coastal Plain Mixed Forest. Common mammalian species in the region include gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*), eastern gray squirrel (*Sciurus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), eastern woodrat (*Neotoma floridana*), and bobcat (*Lynx rufus*) (Moody AFB 2006).

Common bird species in the region, either as breeding residents or migrants, include wild turkey (*Meleagris gallopavo*), northern bobwhite (*Colinus virginianus*), common moorhen (*Gallinula choropus*),

turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), osprey (*Pandion haliaetus*), hairy woodpecker (*Picoides villosus*), mourning dove (*Zenaida macroura*), eastern towhee (*Pipilo erythrophthalmus*), tufted titmouse (*Baeolophus bicolor*), blue jay (*Cyanocitta cristata*), northern cardinal (*Cardinalis cardinalis*), Carolina wren (*Thryothorus ludovicianus*), yellow warbler (*Dendroica petechia*), northern mockingbird (*Mimus polyglottus*), eastern bluebird (*Sialia sialis*), pine warbler (*Dendroica pinus*), and summer tanager (*Piranga rubra*). There are also numerous resident and migratory species of waterfowl, including ring-necked duck (*Aythya collaris*), American wigeon (*Anas americana*), green-winged teal (*Anas crecca*), blue-winged teal (*Anas discors*), bufflehead (*Bucephala albeola*), and wood duck (*Aix sponsa*); and numerous wood warblers and sparrows. The wetland areas in the region support large rookeries of wading bird species, including great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), black-crowned night heron (*Nycticorax nycticorax*), yellow-crowned night heron (*Nycticorax violaceus*), green heron (*Butorides virescens*), snowy egret (*Egretta thula*), great egret (*Ardea alba*), American bittern (*Botaurus lentiginosus*), least bittern (*Ixobrychus exilis*), and white ibis (*Eudocimus albus*) (Moody AFB 2006).

Common reptilian species in the ROI include the eastern box turtle (*Terrapene carolina*), eastern garter snake (*Thamnophis sirtalis*), eastern diamondback rattlesnake (*Crotalus adamanteus*), southern water snake (*Nerodia fasciata*), timber rattlesnake (*Crotalus horridus*), rough earth snake (*Virginia striatula*), ground skink (*Scincella lateralis*), eastern glass lizard (*Ophisaurus ventralis*), and American alligator (*Alligator mississippiensis*). Common amphibian species include the southern chorus frog (*Pseudacris nigrita*), spring peeper (*Hyla crucifer*), eastern newt (*Notophthalmus viridescens*), and tiger salamander (*Ambystoma tigrinum*) (Moody AFB 2006).

Protected and Sensitive Species. Four federally endangered and five federally threatened species potentially occur in the ROI (excluding the LATN Area) (see **Appendix F**) (USFWS 2012). The State of Georgia lists 31 special concern species (5 endangered, 13 threatened, 12 rare, 1 unusual) within the counties in the ROI (excluding LATN Area) (GDNR 2011).

Federally listed threatened or endangered species with the broadest distributions (occurrences or suitable habitat) under the ROI include the frosted flatwoods salamander (*Ambystoma cingulatum*), eastern indigo snake (*Drymarchon corais couperi*), red-cockaded woodpecker (*Picoides borealis*), and wood stork (*Mycteria americana*). The gray bat (*Myotis grisescens*) is the most widely distributed federally listed mammal in the ROI; however, it has a much smaller distribution within the ROI as compared to the previously mentioned amphibian, reptilian, and avian species.

State-listed special concern species with the broadest distributions under the ROI include the frosted flatwoods salamander (Georgia: threatened; Florida: species of special concern [SSC]), eastern indigo snake (Georgia: threatened; Florida: threatened; Alabama: State Protected [SP]), gopher tortoise (Georgia: threatened; Florida: SSC; Alabama: SP), bald eagle (*Haliaeetus leucocephalus*) (Georgia: threatened; Florida: threatened), red-cockaded woodpecker (Georgia: endangered; Florida: SSC; Alabama: SP), and wood stork (Georgia: endangered; Florida: endangered; Alabama: SP). The Florida black bear (*Ursus americanus floridanus*) (Florida: threatened) and gray bat (Georgia: endangered; Florida: endangered; Alabama: SP) are the most widely distributed state-listed mammal species in the ROI; however, they have a much smaller distribution within the ROI as compared to the previously mentioned amphibian, reptilian, and avian species.

Three federally listed threatened and endangered species known from the vicinity of Townsend Range have been identified as occurring or potentially occurring on Townsend Range, including the frosted flatwoods salamander, red-cockaded woodpecker, and wood stork (U.S. Navy 2006, USFWS 2012). Sixteen Georgia special concern animal species known from the vicinity of Townsend Range have been identified as occurring or potentially occurring on the range, including the frosted flatwoods salamander (threatened), gopher frog (rare), striped newt (*Notophthalmus perstriatus*) (threatened), mimic glass lizard

(*Ophisaurus mimicus*) (rare), spotted turtle (*Clemmys guttata*) (unusual), bald eagle (threatened), peregrine falcon (*Falco peregrinus*) (rare), red-cockaded woodpecker (endangered), southeastern American kestrel (*Falco sparverius paulus*) (rare), swallow-tailed kite (*Elanoides forficatus*) (rare), wood stork (endangered), Bachman's sparrow (*Aimophila aestivalis*) (rare), Henslow's sparrow (*Ammodramus henslowii*) (rare), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) (rare), blackbanded sunfish (*Enneacanthus chaetodon*) (endangered), and bluefin killifish (*Lucania goodei*) (rare) (U.S. Navy 2006, GDNR 2011). Of these federally and state-listed species, the occurrence of the frosted flatwoods salamander, wood stork, Bachman's sparrow, and Henslow's sparrow have been confirmed on Townsend Range (U.S. Navy 2006). Frosted flatwoods salamanders have been confirmed breeding within ponds on the western edge of Townsend Range in slash pine forest (U.S. Navy 2006, Moody AFB 2006). Wood storks have been seen flying over and feeding on the range but are not residents and have not been observed nesting on the range (U.S. Navy 2006). Townsend Range does not support many wetlands that storks could use (Moody AFB 2006).

Three federally listed threatened and endangered species are known to occur at Grand Bay Range, including the eastern indigo snake, gopher tortoise, and wood stork. Six Georgia special concern species are known to occur at Grand Bay Range, including the eastern indigo snake (threatened), gopher tortoise (threatened), peregrine falcon (rare), southern bald eagle (*H. l. leucocephalus*) (threatened), wood stork (endangered), and round-tailed muskrat (*Neofiber alleni*) (threatened). The eastern indigo snake, gopher tortoise, and round-tailed muskrat are permanent residents while the bird species are all transient visitors (Moody AFB 2006).

The frosted flatwoods salamander is found in fire-maintained, open-canopied, mesic woodlands of longleaf/slash pine flatwoods and savannas (Moody AFB 2006) and breeds in isolated swamps or marshes that are typically dry for several months each year (Moody AFB 2005a). The eastern indigo snake is found in creek bottoms, upland forests, and agricultural fields during the warm, summer months. During winter, indigo snakes den in xeric sandridge habitat preferred by gopher tortoises. In 2006, there were seven gopher tortoise colonies on Moody AFB and the Grand Bay Range. The gopher tortoise uses habitat that has well-drained, sandy soils in forest and grassy areas associated with pine overstory, open understory, and sunny areas for nesting (Moody AFB 2006).

Although bald eagles were recently delisted from the ESA, they are still federally protected under the Bald and Golden Eagle Protection Act. Bald eagles are also state-listed as threatened in Georgia and Florida. Bald eagles inhabit inland waterways and estuarine areas throughout the ROI and their nests have previously been documented below Moody 1 MOA (seven nests), Moody 3 MOA (one nest), and Live Oak MOA (one nest). No bald eagles were observed during surveys conducted at Townsend Range (Moody AFB 2006).

The red-cockaded woodpecker could potentially occur in low numbers within mature pine forest habitat with low understory vegetation beneath the MOAs associated with the Proposed Action. The closest documented populations of red-cockaded woodpeckers to the ROI have been in Fort Stewart (USACE EDRC 2002), just north of the Coastal 1 East MOA; and in Okefenokee NWR. No red-cockaded woodpeckers were observed during surveys conducted at Townsend Range (Moody AFB 2006). Wood storks nest in wooded swamps and forage in fresh and brackish wetlands. Wood storks have been observed in several places on Moody AFB, including Lot Pond, Shiner Pond, Dudley's Hammock, and Grand Bay Creek. Wood stork nests have also been previously documented under the Moody 1 MOA (five nests) and Live Oak MOA (two nests) (Moody AFB 2006).

Bachman's sparrows are year-round residents in southern Georgia. Bachman sparrow habitat includes mature open pinewoods, regenerating clear-cuts (both pine and hardwoods), and old pastures with a dense ground cover of grasses and forbs. Bachman's sparrows are often associated with open, mature pine

forests where red-cockaded woodpeckers are found, since this habitat often provides the thick grassy ground cover this sparrow prefers (Schneider and Keyes 2010).

Henslow's sparrows occur in southern Georgia during the winter (non-breeding season). Winter habitat includes open, boggy pinewoods, open areas with dense grassy groundcover and little woody vegetation, and similar areas (Schneider 2010).

The gray bat occurs in areas with caves that provide roosting habitat and forage primarily over water along rivers or lakeshores. Gray bats potentially occur under all MOA airspace except Moody 2 North MOA. The Florida black bear uses a variety of habitats including pine flatwoods, longleaf pine forest, hardwood swamps, and sand pine scrub (U.S. Navy 2002). Round-tailed muskrats live in shallow grassy ponds, marshes, and bogs. Preferred habitat appears to be floating mats of vegetation in the vicinity of open water with emergent sedges and floating-leaved vegetation. At Grand Bay, preferred habitat appears to exist mainly along the ecotone between mixed emergent marsh and dense chain-fern marsh (Ozier 2009).

3.8.3 Environmental Consequences

Evaluation Criteria

The significance of effects on biological resources is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological effects. A habitat perspective is used to provide a framework for analysis of general classes of effects (e.g., noise, human disturbance).

Noise associated with a proposed action might be of sufficient magnitude to result in the direct loss of individuals, render habitat unsuitable, or reduce reproductive output within certain ecological settings. Ultimately, extreme cases of such stresses could have the potential to lead to population declines or local or regional extinction. Bird/animal aircraft strikes could particularly have a potential effect on a species population if that species is threatened or endangered.

The Proposed Action

General issues and concerns under the Proposed Action are associated with the increased noise and wildlife strikes from increased air traffic and ordnance use within the ROI. Specifically, there would be increases in day or night flight activities in the following air spaces: Moody 1 MOA (8,000 feet above MSL to 18,000 feet above MSL), Moody 2 North MOA (500 feet AGL to 8,000 feet MSL), Moody 2 South MOA (100 feet AGL to 8,000 feet above MSL), Moody 3 MOA (8,000 feet above MSL to 18,000 feet above MSL), Live Oak MOA (8,000 feet above MSL to 18,000 feet above MSL), Bulldog A MOA (500 feet AGL to 10,000 feet above MSL), Bulldog B MOA (10,000 feet above MSL to 18,000 feet above MSL), Grand Bay Range (surface to 23,000 feet above MSL), Townsend Range (surface to 25,000 feet above MSL), LATN Area (100 feet to 1,500 feet AGL), Coastal 1 East MOA (300 feet AGL to 18,000 feet above MSL), and Coastal 1 West MOA (300 feet AGL to 18,000 feet above MSL).

Noise Impacts on Wildlife. Direct, short-term minor adverse impacts on wildlife would be expected as a result of noise disturbances from increased aircraft operations. Noise levels from sortie-operations associated with the airspace areas analyzed in this EA are presented in **Table 3-7**. High-noise events, such as low-altitude overflights, could cause wildlife to engage in escape or avoidance behaviors (Ellis et al. 1991). These behaviors, which would be expected to impose energy costs, could ultimately diminish survival or growth rates over the long-term. In addition, these noise-avoidance activities could diminish

the time individuals have for feeding or caring for young. Low-altitude overflights would occur within the Moody 2 North MOA, Moody 2 South MOA, Bulldog A MOA, Grand Bay Range, Townsend Range, Coastal 1 East MOA, Coastal 1 West MOA, and LATN Area.

Extensive studies on raptors (Grubb and King 1991, Ellis et al. 1991), wading and shore birds (Black et al. 1984, Burger 1986), songbirds (Higgins 1974, USDA 1992), red-cockaded woodpeckers (USACE 2001), and waterfowl (Acoustical Society of America 1980, Edwards et al. 1979) have all found that birds generally exhibit short-term, minor responses to high-noise events such as flushing, avoidance, or abnormal calls. Long-term, adverse impacts from overflight noise, such as decreases in reproductive success, increased mortality, energetic costs, or permanently leaving a habitat, have not been shown in these studies. Most research also indicates eventual habituation to aircraft noise by avian species (NAS Forth Worth 2004). Waterfowl have been found to be particularly disturbed by aircraft noise and migratory waterfowl have responded to disturbances more readily than other species of water birds (Acoustical Society of America 1980, Edwards et al. 1979, Mancini et al. 1988). However, most species of waterfowl, if startled to the point of being flushed, quickly resume their normal activities once the aircraft has left the area. Although most studies have shown short-term effects from overflights, a study of the wood duck (*Aix sponsa*) suggested that this species did not appear to habituate to aircraft disturbance (Conomy et al. 1998). Additionally, fixed-wing aircraft was attributed for an overall reduction in snow geese flock sizes in a study of waterfowl populations in Alaska and Canada (NAS Forth Worth 2004). Both studies suggest that avian response to aircraft might be species-specific.

Studies of terrestrial mammals have shown that noise levels of 120 dBA can damage mammals' ears, and levels at 95 dBA can cause temporary loss of hearing acuity (NAS Forth Worth 2004). Noise levels from aircraft overflights would not be expected to change noticeably from current levels (presented in **Section 3.3.3**). The number of events per month above 65 dBA SEL would be the same, or less in the case of Moody 2 North MOA, as under baseline conditions (see **Table 3-10**). Studies on the effects of overflights on mammals have been focused largely on ungulates. Studies of subsonic aircraft disturbances on ungulates (e.g., pronghorn, bighorn sheep, elk, and mule deer) in both laboratory and field conditions have shown that effects are transient and of short duration and suggest that the animals habituate to the sounds (Workman et al. 1992, Weisenberger et al. 1996, Krausman et al. 2004). Panic reactions in caribou herds in Alaska have been observed from flights at an altitude of 200 feet or less. Reactions decreased with increasing altitudes and panic reactions stopped at altitudes above 500 feet (NAS Forth Worth 2004). Although extensive studies have been conducted on the behavioral and physiological responses of large herbivores to disturbances including overflights, few studies have related these responses to long-term biologically important changes, such as decreases in reproductive success or habitat use. Therefore, it is not known whether ungulates are significantly affected by overflights, particularly over the long-term (USDA 1992).

Several studies have found large carnivores to show behavioral responses to low-altitude overflights. McCourt et al. (1974) observed that grizzly bears ceased their normal activities and ran away even when small airplanes flew 1,000 feet above them, indicating a fright reaction. Other observers have noted a variety of reactions by grizzlies to aircraft, suggesting strong individual differences (Dufour 1980). Although there are very limited data on the effects of aircraft flyovers on grizzly bears, repeated flyovers could alter their home range, foraging patterns, and breeding behavior (Dufour 1980). Wolves have been frightened by low-altitude flights between 25 to 1,000 feet off the ground (Doll et al. 1973); however, wolves have generally been found to eventually adapt to aircraft overflights and noise (Klein 1973, Mech 1970). Low-altitude flyovers seem to be more disruptive in terrain where there is little cover (Klein 1973). Studies on the effects of overflights on small mammals, particularly rodents, have failed to find any significant effect on populations. The physiological "fight-or-flight" response, while exhibited, does not appear to have any long-term health consequences; however, small mammals are not likely to habituate to sound levels greater than 100 dBA (USDA 1992).

Effects of overflights on amphibians and reptiles have rarely been evaluated. Spadefoot toads (*Scaphiopus couchi*), which inhabit the arid regions of the southwestern United States, were found to emerge from their burrows when recorded motorcycle sounds of intermediate intensity (95 dBA) were broadcasted. Pre-emergence from hibernation burrows could result in a potentially deleterious impact on the toad population. The induced emergence of these toads during a season when water is not available is a potentially detrimental impact on spadefoot toad populations. Recently emerged toads are stressed because their fat reserves are depleted and they are dehydrated. The act of emerging further depletes their energy reserves. If intense sounds, such as low-altitude aircraft, cause the toads to emerge at a time when food and water are not available, chances are likely they would not be able to survive (Brattstrom and Bondello 1983). Since reptiles do not exhibit a well-developed acoustic startle response, they are often regarded as non-susceptible to noise impacts. Many turtles and snakes have very poor hearing (USDA 1992). One study on the Mohave fringe-toed sand lizard (*Uma scoparia*) found lizards that were exposed to taped dune buggy sounds of 95 dB suffered actual hearing loss after exposure (Brattstrom 1979). However, this species is unique from most lizard species in that it has evolved the ability to hear low-intensity, low-frequency sounds (Brattstrom and Bondello 1983).

Although the ROI would see an increase in sortie-operations under the Proposed Action, changes to the types of overflights and weapons are not expected to result in significant impacts on wildlife or wildlife populations due to noise impacts. Overall, research on the effects of noise from overflights on wildlife suggests that although overflights are often initially startling, animals eventually habituate to them under most circumstances. The intensities and durations of the startle response have been shown to decrease with numbers and frequencies of exposure, suggesting little to no long-term adverse effects. The number of events per month above 65 dBA SEL would be the same as or less than under baseline conditions. Therefore, potential impacts on wildlife from the Proposed Action would not be significant.

Bird/Wildlife Aircraft Strike Hazard Impacts on Wildlife. Direct, short-term, negligible, adverse impacts on birds would be expected due to bird and bat airstrikes within the ROI. Approximately 50 percent of recorded bird/wildlife aircraft strikes have been at altitudes lower than 400 feet and almost all strikes have been less than 15,000 feet. Ninety-two percent of recorded bird/wildlife aircraft strikes have occurred below 2,500 feet (USAF 2007b). BASH risk would be highest in airspace components with lower altitudes (e.g., below 2,500 feet, where approximately 92 percent of recorded BASH incidents have occurred), including Moody 2 North MOA, Moody 2 South MOA, Bulldog A MOA, Grand Bay Range, Townsend Range, LATN Area, Coastal 1 East MOA, and Coastal 1 West MOA.

The vast majority of aircraft-wildlife collisions involve common, large-body birds, particularly gulls, waterfowl, and raptors, or large flocks of smaller birds (USAF 2007b). **Table 3-25** shows Moody AFB bird/wildlife aircraft strike rates related to sortie-operations. The total number of bird strikes and corresponding total bird strike rate increased from 2005 to 2010 due to more detailed record-keeping (Griffin 2011). Based on the 10-year average of 7.0 bird strikes per 1,000 sortie-operations by Moody AFB aircraft, a baseline of 260 total bird strikes with Moody AFB aircraft is expected per year. The Proposed Action would increase sortie-operations by approximately 41 percent (to a total of 52,426 sortie-operations). Assuming the same rate of 7.0 bird strikes per 1,000 sortie-operations, the expected number of total bird strikes would increase to 367 under the Proposed Action, representing a 41 percent increase in bird strikes with Moody AFB aircraft annually. It is unlikely that this increase in bird strikes would result in long-term impacts (i.e., population-level impacts) unless the population of concern is threatened or endangered. If bird/wildlife aircraft strikes involve threatened or endangered species, short-term and long-term, minor to moderate, direct, adverse impacts would be expected (see **Section 3.2.3**). **Section 3.2** discusses rates of bird strikes with Moody AFB aircraft that result in damage and the anticipated increase in damaging bird strikes under the Proposed Action.

Table 3-25. Moody AFB Aircraft Bird Strike Rates

Fiscal Year	Number of Sorties	Total Number of Bird Strikes	Total Bird Strike Rate Per 1,000 Sorties
2000	12,383	28	2.3
2001	13,909	41	2.9
2002	30,265	53	1.8
2003	38,668	137	3.5
2004	37,660	100	2.7
2005	20,950	119	5.7
2006	N/A	110	N/A
2007	6,252	109	17.4
2008	8,066	114	14.1
2009	5,218	48	9.2
2010	8,238	83	10.1
10-year average (2000–2010)	18,161	86	7.0

Source: Griffin 2011

Key: N/A = Not Available

Ordnance Impacts on Wildlife. Under the Proposed Action, ordnance use would increase in Townsend Range (see **Table 2-2** for Baseline and Proposed Annual Ordnance Use). The issues associated with use of BDUs, rockets, and ammunition include a potential for these munitions to directly strike biological resources (e.g., direct strikes on species or wildlife habitat) or result in indirect impacts such as disturbances from ground vibration or contamination from the white phosphorus in rockets. Direct physical impacts could result from inert bombs and rockets if wildlife were located near targets and are struck, or if broaching munitions skip and skid across the impact area or outside of the impact area. The target areas within the bombing ranges would be maintained as clear areas and would be considered disturbed habitats; therefore, wildlife habitat values for the cleared areas around the targets would continue to be low. However, because of the cleared land's proximity to wildlife habitats, wildlife could occasionally use these areas to transit to other portions of the ranges (U.S. Navy 2002).

Direct, short-term, negligible, adverse impacts on wildlife would be expected due to direct fatalities from ordnance delivery within the range. Wildlife fatalities from range operations are believed to be uncommon and there are no recorded incidents of wildlife being harmed due to ordnance delivery. The probability of wildlife impact is considered possible, but unlikely. Target areas are viewed prior to each operation. If personnel or animals are observed, operations are suspended until personnel or animals are clear of the hazard area (U.S. Navy 2002). Because of the safety range associated with white phosphorus rockets, combined with high rocket reliability rates (greater than 99 percent) and standard range safety procedures, it is unlikely that a rocket would land outside the restricted target impact boundaries. Therefore, wildlife resources outside of the impact area would not likely be affected (Moody AFB 2006).

Short-term, negligible to minor, adverse impacts on wildlife would be expected due to indirect impacts from ordnance delivery, including ground vibrations and potential contamination from white phosphorus residue. An increase in ground vibrations would be expected given the increase in ordnance use; however, the ground vibrations would greatly diminish through the soil and are not expected to cause

significant impacts (Moody AFB 2006). Impacts associated with chemical aspects of white phosphorus rockets are primarily related to contamination of habitat, particularly aquatic habitats, with phosphorus residue. Phosphorus has potential to accumulate in small isolated water bodies or wetland areas. However, upon detonation from impacting the ground and exposure to air, white phosphorus reacts with oxygen and moisture in the air, leaving nontoxic residues. Therefore, white phosphorus is not expected to accumulate in surface water or on vegetation and there would be little opportunity for waterfowl, wading birds, and other species to encounter or gather white phosphorus particles. The USEPA does not expect community exposures to be severe at a distance of greater than 300 meters downwind (Moody AFB 2006). Additionally, since the smoke from white phosphorus rockets tends to rise due to heat and smoke disperses within 5 to 10 minutes, wildlife within 300 meters are only expected to be negligibly affected (Moody AFB 2006).

Under the Proposed Action, aircrews would use flares during aircraft training in the Moody 2 North and South MOAs. Potential impacts of flare use on biological resources can be direct (e.g., ingestion or mortality from fire caused by flares) and indirect (e.g., effects on water and forage quality, or habitat changes caused by fire) (USAF 2006). Per AFI 11-214, the minimum flare employment altitude in areas that are not government-owned or controlled property (i.e., the areas underlying the Moody 2 North and South MOAs) is 2,000 feet AGL. Details of direct and indirect impacts on biological resources due to the use flare include the following (USAF 2006):

- ***Ingestion or Physical Contact.*** Negligible impacts on wildlife resulting from ingestion of or other bodily contact with materials would be expected. The release of flares results in flare wrapping material (i.e., four or five plastic pieces and aluminum-coated Mylar wrapping) falling to the ground. Because of the low rate of application and dispersal of flare material during defensive training, it is anticipated that instances in which animals would ingest or otherwise come in contact with these residual materials would be minimal. Field studies conducted at Nellis Air Force Range in Nevada indicated that flare debris does not tend to accumulate in noticeable quantities (ACC 1997). The plastic parts, such as end caps, are inert and are not expected to be used by or consumed by any species (Elmendorf AFB 2006). The aluminum coated wrapping, as it degrades, could produce fibrous materials similar to naturally occurring nesting materials. There is no known case of such materials being used in nest construction (Elmendorf AFB 2006, ACC 1997). Although lighter flare debris could be used by species under the airspace, such use would be expected to be infrequent and incidental.
- ***Water and Forage Quality.*** Negligible impacts on water and forage quality would be expected. Confined aquatic habitats would only be at risk if there were large-scale accumulation and decomposition of dud flares; however, it is expected that these materials would be broadly distributed with low densities. Therefore, water quality is not expected to be impacted. The magnesium in flares can be toxic at extremely high levels (i.e., repeated and concentrated use in localized areas or several dud flares deposited in one water body). Flare ash would be dispersed over a large area and the probability of several dud flares being deposited in the same area is very unlikely; therefore, no effect of flares on water quality would be expected.
- ***Fire.*** A fire could result in short-term, minor to moderate, direct, adverse effects. Ecosystem changes that might result from fire include (1) the introduction and spread of invasive and exotic plants, (2) habitat fragmentation leading to increased vulnerability of isolated populations, and (3) increased wind erosion of soil following fire. Therefore, fires resulting from flare usage could result in direct losses and indirect negative effects. Even though a flare-caused fire would be an extremely rare event, a wind-driven fire could spread to other areas. While fires are not a regular constituent of the environment within the ROI, they can result in substantial short-term damage to habitat and can injure or kill wildlife species that are unable to escape (USAF 2006).

Noise Impacts on Protected and Sensitive Species. The potential impacts from aircraft overflights in the ROI on threatened and endangered species are expected to be similar to those discussed previously for wildlife. As discussed in **Section 3.8.2**, bald eagles, red-cockaded woodpeckers, and wood storks have been known to nest under portions of the ROI. The effects of aircraft noise on the bald eagle have been relatively well-studied. Overall, there have been no reports of reduced reproductive success or physiological risks to bald eagles exposed to aircraft overflights or other types of military noise (Grubb and King 1991, Ellis et al. 1991). A study on the reactions of the bald eagle to human disturbances showed that terrestrial disturbances such as pedestrians and helicopters elicited the greatest response and were assumed to be more disturbing to bald eagles than fixed-wing aircraft, including military jets (Grubb and King 1991). Ellis et al. (1991) found that eagles typically respond to the closeness of a disturbance rather than the noise level. To minimize disturbance to bald eagle nest areas and reduce potential BASH incidents, military aircraft would avoid nest areas by 1 mile laterally and 1,500 feet AGL from September 15 through June 1 (Moody AFB 2006).

A study comparing the responses of various species of colonial nesting birds (including a small number of wood storks) to three types of census methods for rookeries, including ground-based, helicopter, and fixed-wing censuses, found that, in general, most species were more disturbed by the human intrusion of the ground-based census than by helicopters or fixed-wing aircraft flying as low as 200 feet AGL (Kushlan 1979). Nesting wood storks have also been found to have the smallest flush distance in response to disturbance compared to other similar species (Rodgers and Smith 1995). Military aircraft would avoid known wood stork colonies by 1 mile laterally from March through June (Moody AFB 2006). The USFWS updates bald eagle and wood stork locations to Moody AFB Natural Resources every 2 to 3 years. This updated information is provided to the Moody AFB flying communities to ensure these lateral rules are followed (Moody AFB 2006). Therefore, the Proposed Action would be expected to have no effect on bald eagles or wood storks underlying the airspace in the Proposed Action.

A 3-year study conducted on red-cockaded woodpecker behavioral response to noise in nearby Fort Stewart in southern Georgia suggested that military weapons noise (e.g., artillery simulators and 0.50-caliber machine gun fire) does not appear to be a significant limitation to red-cockaded woodpecker reproductive success. Woodpeckers were not noticeably disturbed by any level of heavy weapons noise used during the last year of the study and previous years' studies indicated that the birds were not generally disturbed by heavy weapons firing when the source was greater than 1,000 meters from an active nest. The proportion of red-cockaded woodpeckers that flushed in response to experimental training noise was negatively related to stimulus distance and positively related to noise level. The study indicated that infrequent, short duration (less than 2 hours) military training exercises in close proximity to active red-cockaded woodpecker nest sites would not significantly impact red-cockaded woodpecker fitness rates on military installations. Military maneuver training noise was not believed to be a limiting factor in the recovery of red-cockaded woodpeckers, which was particularly evidenced by that fact that the numbers of active, nesting, and successful red-cockaded woodpecker nests on Fort Stewart increased each year during the study (USACE ERDC 2002). Potential noise impacts on red-cockaded woodpeckers can be decreased by maintaining a distance of 100 meters or greater from any active nest along flight paths (Moody AFB 2006).

Noise resulting from aircraft overflights would not be expected to increase migratory bird mortality or decrease reproductive output; and would not be expected to have population-level impacts on migratory bird species. According to the final rule on take of migratory birds by the Armed Forces (50 CFR

14 Part 21) and the 2003 National Defense Authorization Act (see **Appendix B**), the Armed Forces (including Moody AFB) are authorized for the incidental taking of migratory birds, with limitations, that occurs during military readiness activities. If the USAF determined that training flights within the ROI would result in a significant effect on a population of migratory bird species, it would have to confer and

cooperate with the USFWS to develop appropriate conservation measures to minimize or mitigate the identified significant effect.

In summary, the baseline noise exposure from aircraft and ordnance use within the ROI has not resulted in reports of significant negative impacts on sensitive species. Although the Proposed Action increases the existing sortie-operations and ordnance use in the ROI, research on the effects of noise on wildlife suggests that although overflights are often initially startling, animals eventually habituate to them under most circumstances. The intensities and durations of the startle response have been shown to decrease with numbers and frequencies of exposure, suggesting little to no long-term adverse effects. It would be expected that the startle response to ordnance noise would be similar to the response to overflights. The number of events per month above 65 dBA SEL would be the same as or less than under baseline conditions. Additionally, known occurrences of threatened or endangered species nests or colonies would be avoided to the extent possible. Therefore, potential impacts on protected and sensitive species from the Proposed Action would be minor and would not be expected to adversely affect any listed species.

BASH Impacts on Protected and Sensitive Species. If bird/wildlife aircraft strikes involve threatened or endangered species, direct, short-term and long-term, minor to moderate, adverse impacts would be expected. Relative BASH risks among the various airspace components would be similar as those described for BASH impacts on wildlife.

Ordnance Impacts on Protected and Sensitive Species. Impacts on threatened and endangered species and migratory birds from increased ordnance delivery would be expected to be similar to the impacts described for wildlife; however, ordnance use at Townsend could result in the “take” of state or federally listed species. Confirmed federally listed species present on the Townsend Range include the frosted flatwoods salamander and wood stork. These species, in addition to the Bachman’s sparrow and Henslow’s sparrow, are also state-listed special concern species. The proposed increase in ordnance operations at Townsend Range would increase the risk of munitions directly striking flatwoods salamanders that are near targets, or if broaching munitions skip and skid across the impact area or out of the impact area. Wood storks have been seen flying over the range but have not been observed nesting or feeding on the range. Townsend Range does not support many wetlands that storks use; therefore, it would be highly unlikely that a wood stork would be impacted by increasing inert munitions (Moody AFB 2006). The two state-listed sparrow species would not be expected to be directly impacted by munitions strikes. Short-term and intermittent, indirect, adverse impacts on any potential Bachman’s and Henslow’s sparrows and migratory birds near the targets would be expected from increased disturbances associated with ordnance delivery.

The increase in ordnance delivery on the Townsend Range under the Proposed Action could affect, but would not be likely to adversely affect, federally protected species. Under previous consultation with the USFWS performed during the 2006 Moody BRAC EA concerning increased ordnance requirements in Townsend Range, USFWS concurred with the USAF’s determination that increased ordnance could affect, but would not be likely to adversely affect, federally protected species (Moody AFB 2006).

No Action Alternative

Under the No Action Alternative, the proposed expansion of sortie-operations within existing airspace and a corresponding weapons expenditure rate increase on the existing ranges would not occur. There would be no impacts on vegetation; wetlands; wildlife or wildlife habitat; or threatened, endangered, or other sensitive species under the No Action Alternative.

3.9 Hazardous Materials and Wastes

3.9.1 Definition of the Resource

Hazardous materials are defined by 49 CFR 171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR Part 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR Parts 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. 6903(5), as amended by the Hazardous and Solid Waste Amendments, as “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR Part 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

The DOD has developed the Environmental Restoration Program (ERP), which facilitates environmentally responsible land management thorough investigation and cleanup of contaminated sites on military installations. Through the ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be restricted until remediation of a groundwater contaminant plume has been completed).

For the USAF, Air Force Policy Directive 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all Federal regulations, and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards. Evaluation extends to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of the Proposed Action.

3.9.2 Existing Conditions

Moody AFB is classified as a large-quantity generator of hazardous waste per Federal Guidelines Title 40 of CFR 260.10 and 262.34. The installation maintains a USEPA hazardous waste generator identification number (#GA0570024109) as required in 40 CFR 262.12 (Moody AFB 2006).

Hazardous wastes generated at the installation primarily emanate from the maintenance and operation of military aircraft. Typical hazardous wastes include paint, paint-stripper, paint-contaminated rags, and degreasers. Fluids, such as used oil, are tested to determine whether they should be disposed of as hazardous or nonhazardous waste. Waste oil, jet fuel, antifreeze, brake fluids, and batteries are disposed of through the Defense Reutilization and Marketing Office (Moody AFB 2006, Grand Bay Range 2008). Hazardous wastes are collected in 55-gallon metal drums or other suitable containers. Currently, Moody

AFB has one 90-day waste storage facility which is operated and managed by a private contractor (Moody AFB 2008c).

Grand Bay Range has one satellite accumulation point. The 23 WG establishes the frequency of decontamination based on the type of use, mission requirements, and specific circumstances surrounding range use. However, decontamination and range clearance are completed as specified in AFI 13-212, *Range Planning and Operations*. Grand Bay Range also has a semi-annual clearance schedule with cleanup typically scheduled during March and April and September and October. The range also has an approved open detonation area within the range boundary. Other hazardous waste generated by the range (i.e., fluids, oils) are safely accumulated and disposed of per the Moody Hazardous Waste Management Plan (Grand Bay Range 2008).

Townsend Range is a conditionally exempt small-quantity generator of hazardous waste per Federal Guidelines Title 40 of CFR 260.10 and 262.34 and has been assigned USEPA identification number GAD984319624. The small amounts of hazardous waste generated are managed for disposal through the Defense Reutilization and Marketing Office.

At Townsend Range, MCAS Beaufort conducts range clearance operations during 5 working days every other month, for a total of 6 weeks per year. A 5-year plan has been established for annual range clearance that includes clearing the entire range over a 5-year period. Consistent with Headquarters U.S. Marine Corps guidance, munitions deliveries at Townsend Range are reported as range releases in annual Emergency Planning and Community Right-to-Know Act Section 313 Toxic Release Inventory reporting based on the type and amount of ordnance used. This reporting contributes to a national database that lists facilities and annual amounts of chemicals released on site into the air, water, land, and injected underground; and offsite recycling, energy recovery, treatment, and disposal of munitions. Under this program, Federal facilities are required to report any chemical releases. One chemical, lead, is released at quantities greater than the 100-pound threshold for reporting. The annual release of lead at TBR is estimated at approximately 1,100 to 1,200 pounds (MCAS Beaufort 2008).

Munitions fragments and residues are generated on a recurring basis at Townsend Range as a result of the range training missions. Under current practice, munitions debris is recovered or removed from the ranges for the purpose of storage, reclamation, and disposal as solid waste. Occasionally, the charge in a training munition fails to detonate. If this occurs, range personnel will destroy all explosive hazards and then supervise the collection of any resulting debris. Headquarters ACC provides a range residue removal contract to periodically visit ACC ranges and dispose of range residues. In accordance with AFI 13-212, the ranges are cleared of munitions debris on a regularly basis, with a complete boundary-to-boundary debris clearance conducted every 5 years (Moody AFB 2006).

3.9.3 Environmental Consequences

Evaluation Criteria

Impacts would be considered significant if a proposed action resulted in worker, resident, or visitor exposure to hazardous materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on hazardous materials management would be considered significant if the Federal action resulted in noncompliance with applicable Federal and state regulations, or increased the amounts generated or procured beyond current Townsend Range waste management procedures and capacities.

Proposed Action

The Proposed Action would occur at established air-to-ground gunnery ranges. Common ordnance used at these ranges includes those listed in **Table 2-2**. The use of approximately 6,700 pounds of munitions-related debris was assessed in the 2006 BRAC EA at Townsend Range. Under the Proposed Action there would be an increase of ordnance use of 77 percent at Townsend Range. The increased ordnance use would not change the hazardous materials and waste management programs already in place at Townsend Ranges. The increased munitions dropped on this range would be inert, except for rocket fire, and are similar to the munitions currently being used at the range. Townsend Range would continue to implement current surface range clearance procedures in accordance with AFI 13-212. Range and impact areas would continue to be cleared on a regular basis. Trained EOD personnel inspect all debris. If items are deemed hazardous or unknown, personnel use a small charge to eliminate the danger of explosion. Therefore, no impacts on hazardous wastes would be expected from the Proposed Action. Townsend Range would continue their current range cleaning operations.

Under the Proposed Action, an increase in aircraft operations would occur at Grand Bay Range, but there would not be an increase in ordnance use. Therefore, no impacts on hazardous wastes would be expected at Grand Bay Range.

No Action Alternative

Under the No Action Alternative, no impacts would be expected. There would be no increase in ordnance activity associated with Moody AFB aircraft. In general, there would be no change in impacts on environmental restoration or hazardous materials and wastes at Townsend Range if the Proposed Action were not implemented.

4. CUMULATIVE AND OTHER ADVERSE AFFECTS

Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

4.1 Projects Considered for Potential Cumulative Impacts

2006 BRAC Recommendation. The 2006 BRAC EA analyzes the potential environmental consequences associated with the BRAC recommendation to bed down the A-10 aircraft. Moody AFB distributed 68 T-38C aircraft, distributed 45 T-6A aircraft, received 48 A-10 aircraft, received installation-level TF34 engine intermediate maintenance, and relocated installation-level ALQ-184 intermediate maintenance.

Bemiss Field. The USAF prepared the *Final Environmental Assessment for Bemiss Field Unimproved Landing Zone* at Moody AFB, 2008 to evaluate the potential environmental impacts of a proposed Unimproved Landing Zone at Bemiss Field. An increase in the number of HH-60, HC-130, and transient sortie-operations is assessed.

Expansion of Bulldog MOAs. The USAF, in cooperating efforts with the FAA, has completed the *Final Environmental Impact Statement (EIS) for the Airspace Training Initiative, Shaw Air Force Base, South Carolina* and a ROD was signed December 9, 2011 (Shaw AFB 2011). The Preferred Alternative includes the expansion of the Bulldog B MOA through the creation of two new MOAs, Bulldog C and Bulldog E. The new MOAs are proposed under the existing Bulldog B MOA. The new Bulldog E MOA will be created contiguous with Bulldog A MOA's southern boundary and will extend from 500 feet AGL up to, but not including, 10,000 feet MSL. The new Bulldog C MOA will be created contiguous with Bulldog A MOA's southeastern boundary and with the Bulldog E MOA. Bulldog C MOA will also extend from 500 feet AGL up to, but not including, 10,000 feet MSL. Civilian airports within the proposed Bulldog C and E MOAs will have a minimum exclusionary area of 3 NMs and 1,500 feet AGL. The dimensions of the Bulldog B MOA will not change and will overlies the existing Bulldog A MOA as well as the Bulldog C and E MOAs (Shaw AFB 2010).

C-130 Recap. In December 2009, ACC was granted a Categorical Exclusion under NEPA for the recapitalization (i.e., replacement) of HC-130P aircraft to HC-130J aircraft at Moody AFB (ACC 2009). The HC-130 recapitalization at Moody AFB is part of a larger effort which involves the replacement of 33 HC-130P/N and 4 MC-130P aircraft with 78 HC-130J models across the USAF. Potential connected actions include upgrading, replacing, or building required facilities. The recapitalization is necessary because the current fleet represents the oldest airframes in the USAF inventory and will lose airworthiness in 2013. As the HC-130 recapitalization process progresses, the replaced HC-130P aircraft would be retired (ACC 2009).

Project to Lower A-10 VFR Altitude. The 23 WG proposes to lower the VFR altitude for A-10 aircraft within the Moody AFB Class D airspace from 2,000 feet AGL to 1,500 feet AGL. Moody AFB needs to lower the A-10 VFR altitude in order to meet standard A-10 flight training requirements and current mission needs. Currently, A-10 aircraft at Moody AFB only use VFR at 1,500 feet AGL when weather does not permit VFR operation at 2,000 feet AGL. This occurs regularly due to changing weather and climate conditions inherent to southeastern Georgia. The proposed VFR change would occur in Class D

airspace only (i.e., the airspace immediately surrounding the Moody AFB airfield), and would not affect IFR patterns. An EA will be completed to analyze the environmental impacts of this project.

Range Ops. The 23 WG proposes to continue existing and conduct new air-to-ground and ground-based training activities at Grand Bay Range. The proposed air-to-ground activities would include new transient aircraft use of the range, and a greater number of munitions expenditures for existing users. The new ground-based training activities would include live ground fire within the impact area and at Bemiss Field. An EA will be completed to analyze the environmental impacts of this project.

Personnel Recovery Campus Project. The USAF is preparing an EA to evaluate the consolidation of all 347 RQG aviation functions into one physical area on Moody AFB. This would include the development of appropriate facilities and infrastructure to support the anticipated Rescue Group mission growth, improve operational and energy efficiencies, and potentially eliminate airfield waivers. The majority of the construction includes a four-bay hangar, flight simulator, expansion of the existing parking apron, and a helicopter landing lane. The construction of the helicopter landing lane would require the creation of new clear zones (CZs) and accident potential zones (APZs). The DOD developed these zones for fixed-wing and helicopter runways to define the areas that have a high relative potential for accidents.

CAU for A-10 Training. In September 2008, a FONSI was signed to establish a CAU to train with A-10 aircraft, perform maintenance, and complete medical functions at Moody AFB. The establishment of a CAU at Moody AFB included the following:

- Working and training side-by-side with the host unit (i.e., 23 WG)
- Training operations during the week (in conjunction with the normal active-duty flying program) and one weekend per month
- CAU pilots conducting range-oriented training operations at Grand Bay and Townsend Ranges.

This action involves an estimated 1,800 flight hours per year and would be required to support CAU A-10 training at Moody AFB. During one weekend per month, reserve pilots would fly an estimated 18 sorties. The additional flight hours associated with the CAU would be completed using the Wing's existing aircraft.

Pinecastle Range. In 2002, the U.S. Navy proposed to renew its authorization from the U.S. Forest Service to use Pinecastle Range (U.S. Navy 2002). An EIS was prepared for training operations at Pinecastle Range and a ROD was issued for continued operations, as long as the U.S. Forest Service issued a Special Use Permit. The U.S. Forest Service issued a 20-year permit and its associated Operation Plan including mitigation measures to ensure public safety. The U.S. Navy continues to operate under the conditions of the Special Use Permit and Operating Plan. The number of sortie-operations that would be flown and the number of ordnance used at Pinecastle Range by Moody AFB airmen would be at levels assessed in the 2002 Pinecastle EIS.

Pinecastle Range Expansion Project. An EA addressing the expansion of the Pinecastle Range Complex Restricted Area will analyze the proposed action of expanding the lateral and vertical limits of restricted areas R-2907A, R-2907B, and R-2910 in north central Florida. The U.S. Navy requested this action to expand portions of restricted airspace areas by incorporating unrestricted corridors to provide continuous training airspace. This expansion would result in larger contiguous restricted areas so that flight maneuvering and weapons deployment could occur in a realistic training scenario. This action would enhance the margin of safety for air traffic in the Lake George and Pinecastle, Florida areas (FAA 2010).

Navy Atlantic Fleet Training. In June 2009, a ROD was issued for the Final EIS/Overseas Environmental Impact Statement (OEIS) for the Jacksonville Range Complex Training (Department of the Navy 2009). The EIS/OEIS assesses the creation of the Jacksonville Range Complex and associated activities for SUA off the coasts of North Carolina, South Carolina, Georgia, and Florida. This includes Navy Atlantic Fleet training, research, development, testing, and evaluation activities and range capabilities enhancements in the Jacksonville Range Complex.

GRASI Strategic Plan. The Gulf Regional Airspace Strategic Initiative (GRASI) Strategic Plan addresses the availability of airspace in the Gulf Coast region with the military missions and rising civilian population (GRASI 2011). Moody 3 MOA is included in the eastern airspace region of this plan. Several goals were developed including: modernize ATC procedures and airspace; enhance military capacity of the region; and maintain and enhance regional collaboration. One of the recommendations to obtain these goals includes the establishment of an Air Traffic Control Assigned Airspaces (ATCAA) over the GRASI region. The ATCAAs would be streamlined across the region for a more uniform structure and ease of use by various agencies. This would increase the airspace available for training and reduce conflicts. The ATCAAs would not impact other SUA users and would be controlled by a single agency. Another recommendation would include the development of systems to enhance the coordination between scheduling entities to enable use of surrounding SUAs within the GRASI region when they are available.

4.2 Cumulative Effects on Resource Areas

The Bemiss Field EA, the 2006 BRAC EA, C-130 Recap, and the CAU for A-10 training include past actions that have occurred at Moody AFB (Moody AFB 2008d, Moody AFB 2006, and Moody AFB 2008b). These changes in the number and type of sortie-operations at Moody AFB have been included in the analysis in this EA. The changes in transient users of Grand Bay Range identified in the Range Ops EA are also included in the analysis in this EA.

Airspace Management and Flight Safety. Cumulative impacts on airspace management are predicated on the extent to which air traffic within the MOAs, Restricted Areas, and LATN areas analyzed in this EA would be affected. The additional 1,800 hours of A-10 training would not be expected to have a cumulative impact on airspace management and have been included as part of the baseline in this EA.

No impacts to air traffic and airspace utilization are anticipated from the proposed action analyzed in the *EIS for the Airspace Training Initiative* (Shaw AFB 2010). Since no adverse impacts on airspace management and flight safety would be expected from the Proposed Action in this EA, cumulative adversely affects would not be expected.

A-10 aircraft at the Moody AFB airfield currently fly VFR at 1,500 feet AGL under certain weather conditions. Therefore, the permanent lowering of the A-10 VFR altitude from 2,000 feet AGL to 1,500 feet AGL would not be expected to adversely affect airspace management or aircraft safety.

The creation of the helicopter landing lane included in the Personnel Recovery Campus EA would be expected to have a minor impact on airspace management and aircraft safety. Any changes in existing flight tracks to access the new landing lane would be incorporated into Moody AFB's existing flight procedures and would not be expected to hamper Valdosta RAPCON's ability to direct military aircraft passing from one of Moody AFB's SUA areas to another. Moody AFB currently does not have any scheduling issues with their airspace, and has determined that excess capacity is available. Therefore, any changes in airspace management as a result of the creation of the helicopter landing lane and the increase in sortie-operations analyzed in this EA would not be expected to have a significant impact on airspace management. Creation of the CZs and APZs for the helicopter landing lane would be within the existing

CZs and APZs. The continued implementation of AFI 91-202 would be expected to reduce the potential for mishaps; therefore, long-term, minor, adverse cumulative impacts on aircraft safety would be expected from operation of the helicopter landing lane and the increase in sortie-operations included in this EA.

Pinecastle Range does not usually have airspace management issues with civilian aircraft; however, there are three restricted areas in close proximity to the range (R-2907A associated with Lake George Range, R-2906 associated with Rodman Range, and R-2907B) and civilian aircraft occasionally fly in between the Restricted Areas, which can be a safety concern. This issue is currently being analyzed in the Pinecastle Range EA. If implemented, the proposed action in the Pinecastle Range Expansion EA would result in beneficial impacts to flight safety. Approximately two to four times a year, the Carrier Battle Group of the U.S. Navy conducts major exercises off the coast of Florida. During this period, which lasts several weeks, the U.S. Navy trains at Pinecastle Range for 5 to 8 days. The USAF would need to be notified that Pinecastle Range is heavily used during these periods. Other than the U.S. Navy exercises, Pinecastle Range does not currently have any scheduling issues with their airspace (Vleck 2009).

As previously mentioned, recommendations in the GRASI Strategic Plan include streamlining ATCAAs and enhancing the coordination between scheduling entities to enable use of surrounding SUAs within the GRASI region when they are available (GRASI 2011). The new ATCAAs would have a more uniform structure and would increase the airspace available for training while reducing conflicts. The ATCAAs would not impact other SUA users and would be controlled by a single agency. If the recommendations in the Strategic Plan were implemented, the additional ATCAA airspace and enhanced scheduling would likely result in beneficial impacts on airspace management and flight safety.

No significant adverse cumulative impacts on airspace management and flight safety are expected from the Proposed Action in this EA combined with the projects considered for cumulative impacts in **Section 4.1**.

Noise. Noise levels at Bulldog A and Bulldog B MOAs were calculated in this EA and were below the 55 dBA L_{dnmr} threshold for both the baseline conditions and the Proposed Action. In addition, the number of events above 65 dBA SEL did not increase under the Proposed Action at Bulldog A and Bulldog B MOAs. Under the proposed action in the *EIS for the Airspace Training Initiative*, the floor of Bulldog B MOA would be lowered from 10,000 feet above MSL to 500 feet AGL. As a result, the areas beneath the Bulldog C and E MOAs would be exposed to noise levels between 47 to 52 dBA L_{dnmr} . Noise levels beneath the existing Bulldog A MOA would decrease slightly from 49 to 47 dBA L_{dnmr} from low and medium altitude training expanding into the newly created Bulldog C and E MOAs (Shaw AFB 2010). These noise levels are below the 55 dB threshold identified by USEPA as a level to consider the potential for impact. Since there would not be an increase in noise levels at Bulldog MOA as a result of the Proposed Action in this EA, and a significant increase was not analyzed under the proposed action in the *EIS for the Airspace Training Initiative*, cumulative, adverse impacts would not be expected.

The Class D airspace surrounding Moody AFB overlaps with R-3008A, B, and D (associated with Grand Bay Range), and small portion of the Moody 1 MOA. The USAF is proposing, under a separate NEPA action, to lower the A-10 VFR altitude from 2,000 feet AGL to 1,500 feet AGL within the Moody Class D airspace. This would likely result in an increase in noise levels. The estimated noise levels in the area where R-3008A, B, and D, and Moody 1 MOA overlap are 70.7 dBA L_{dnmr} (see **Table 3-11**). The lowering of the VFR altitude would likely contribute slightly to the noise impacts that would result from the increase in sortie-operations addressed in this EA. Therefore, minor cumulative increases in noise levels would be expected.

ATCAAs are created to permit the continuation of MOA activities above 18,000 feet above MSL. Consequently, the possible establishment of an ATCAA over the GRASI region would not likely impact

noise levels on the ground. However, if this action that is recommended in the GRASI Strategic Plan were proposed, environmental documentation would be completed.

Under the proposed action in the Personnel Recovery Campus EA, there would be a shift in the noise contours to the north and west of Moody AFB. Approximately 73 receptors would be exposed to an increase in noise levels; the majority would be exposed to an increase in levels of less than 3 dBA. Moody 1 MOA encompasses the airspace above the Moody AFB airfield. However, the floor of Moody 1 MOA is 8,000 feet above MSL; therefore, aircraft flying within this MOA are considerably higher than aircraft arriving and departing at the airfield that were analyzed in the Personnel Recovery Campus EA. Under the Proposed Action in this EA, the noise level in Moody 1 MOA would be less than 55 dBA L_{dnmr} , which is not considered significant. The noise level within R-3008A (the portion of the airspace associated with Grand Bay Range that is within the Moody AFB installation boundary) under the Proposed Action would increase to 69.6 dBA L_{dnmr} . However, land within R-3008A consists entirely of Moody AFB property. Since the noise contours would shift to the north and west (away from the Grand Bay Range) under the proposed action in the Personnel Recovery Campus EA, and no significant impacts to populations would be expected under the Proposed Action in this EA, no significant cumulative impacts to the noise environment would be expected.

It is expected that the construction activities analyzed in the Personnel Recovery Campus EA would be of a short duration and would occur during normal business hours. Therefore, the noise from construction activities in conjunction with the noise from the increased sortie-operations analyzed in this EA would be expected to have a short-term, minor, adverse effect on the ambient noise environment at Moody AFB.

Noise levels at Pinecastle Range were calculated in the Pinecastle EIS to include the A-10 sortie-operations that would be flown by Moody AFB airmen (U.S. Navy 2002).

Based on the projects known to date in the ROI, minor cumulative increases in noise levels would be expected; although it is not expected that they would be significant.

Land Use. Land underlying Bulldog B MOA includes numerous developed areas and some parks, such as George L. Smith State Park and Magnolia Springs State Park. As discussed previously, the increase in sortie-operations proposed in this EA would only contribute slightly to noise impacts on noise-sensitive receptors. As stated in the *EIS for the Airspace Training Initiative*, land use impacts are not anticipated and aircraft noise would not be expected to significantly impact residential areas, farms, parks, or wildlife refuges. Therefore, no cumulative effects on land use would be expected.

Land use underlying Grand Bay Range and a small portion of the Moody 1 MOA (where the change in the A-10 VFR pattern altitude would occur) includes rural residential, agriculture and wetlands (SGRDC 2009). As discussed previously, although there would likely be an increase in noise levels if the A-10 VFR pattern altitude was lower by 500 feet AGL, the increase in sortie-operations proposed in this EA would likely contribute slightly to noise impacts on noise-sensitive receptors.

The construction of the helicopter landing lane included in the Personnel Recovery Campus EA would require the creation of a new CZ and APZ. The southern CZ and APZ would be within the Moody AFB installation boundary. The northern CZ would also be within the installation boundary; however a large portion of the northern APZ would extend outside the installation boundary. Per USAF guidelines, the Personnel Recovery Campus EA would provide land use planning recommendations in this area for the protection of the public. Of the existing airspace areas analyzed in this EA, only the Moody 1 MOA would overlap with the land that would be within the proposed northern APZ. Noise levels in the areas underlying the Moody 1 MOA would be below 65 dBA L_{dnmr} under Proposed Action conditions. Sound levels below 65 dBA L_{dnmr} are considered compatible with all land uses.

No significant adverse cumulative impacts on land use are expected from the Proposed Action in this EA combined with the projects considered for cumulative impacts in **Section 4.1**.

Socioeconomic Resources and Environmental Justice. Disproportionate impacts on minority, low income populations, or children are not expected from the projects considered for cumulative impacts in **Section 4.1** or the proposed action in this EA. In addition, no adverse impacts to socioeconomic resources are expected. Therefore, no cumulative impacts on socioeconomic resources and environmental justice are expected.

Cultural Resources. As stated in the *EIS for the Airspace Training Initiative*, no tribal lands are beneath the Bulldog MOA and no traditional cultural resources or areas of religious or cultural significance were identified in the project area. In addition, the Georgia SHPO found that no historic properties or archaeological resources that are listed in or eligible for listing in the NRHP will be affected by this undertaking. Since no significant impacts on cultural or architectural resources from aircraft noise are expected from the Proposed Action in this EA, no cumulative impacts are expected.

In the ROD for the *Jacksonville Range Complex Training EIS*, the SHPOs in Florida, Georgia, North Carolina, and South Carolina concurred that no historic properties would be affected by the implementation of the Preferred Alternative.

No significant adverse cumulative impacts on cultural resources are expected from the Proposed Action in this EA combined with the projects considered for cumulative impacts in **Section 4.1**.

Air Quality. Cumulative impacts on regional air quality were considered; however, since emissions associated with the Proposed Action would only slightly increase in both attainment and nonattainment areas, the Proposed Action is not expected to contribute significant adverse air quality impacts in the ROI.

No air emissions were calculated in Bulldog B MOA under baseline conditions or the Proposed Action in this EA since flight operations occur above the 3,000 feet AGL mixing layer. The results of the modeling analysis in the *EIS for the Airspace Training Initiative* show that the Proposed Action would produce minimal and less than significant impacts to ambient pollutant levels (Shaw AFB 2010). If the floor of Bulldog B MOA was lowered to 500 feet AGL, and A-10 aircraft flew at a lower altitude than what is currently allowed in Bulldog B MOA, the sortie-operations identified under baseline conditions and the Proposed Action in this EA would impact air quality in that region. However, given that the Proposed Action in the *EIS for the Airspace Training Initiative* would produce minimal impacts, aircraft emissions from the additional 332 sortie-operations proposed in this EA would not be expected to have a significant cumulative impact on air quality.

Air emissions from the Proposed Action in Grand Bay Range and Moody 1 MOA (where the change in the A-10 VFR pattern altitude would occur) would be below *de minimis* thresholds. The A-10 VFR pattern altitude is currently 2,000 feet AGL, which is below the 3,000 feet AGL mixing layer. Therefore, air emissions from flight operations within Moody's Class D airspace are already occurring under baseline conditions. The increase in sortie-operations and the lowering of the A-10 pattern altitude would be expected to have minor, adverse impacts on regional air quality.

The construction activities included in the Personnel Recovery Campus EA would result in temporary increases in emissions in the local and regional environment. Of the 12 airspace areas evaluated in this EA, only the Moody 1 MOA would overlap with the location of construction activities included in the Personnel Recovery Campus EA (i.e., the aircraft parking apron and surrounding area northwest of the Moody AFB runways). Emissions from construction activities and the increase in sortie-operations

analyzed in this EA are expected to be below *de minimus* thresholds; therefore, cumulative impacts on local and regional air quality would not be expected to be significant.

No significant adverse cumulative impacts on air quality are expected from the Proposed Action in this EA combined with the projects considered for cumulative impacts in **Section 4.1**.

Biological Resources. The number of events per month above 65 dBA SEL did not increase in Bulldog B MOA under the Proposed Action. If the floor of Bulldog B were lowered to 500 feet AGL and the A-10 aircraft flew the proposed sortie-operations at a lower altitude than what is currently allowed in Bulldog B MOA, wildlife could be impacted. However, as stated in the *EIS for the Airspace Training Initiative* the average noise exposure from aircraft would be comparable or slightly higher to the current levels, which has not resulted in reports of significant negative impacts to wildlife or domestic animals (Shaw AFB 2010). In areas where average noise levels are predicted to increase (Bulldog C and E MOAs), animals, including special-status species, migratory birds, and domestic animals, may startle or temporarily shift habitat use or activities; however, based on previous studies, wildlife and domestic animals habituate and return to normal activities. Given that the Proposed Action in the *EIS for the Airspace Training Initiative* would not result in significant impacts, and the Proposed Action presented in this EA would not result in significant impacts, cumulative impacts on biological impacts are not expected.

The number of events per month above 65 dBA SEL would also not increase in Grand Bay Range or the Moody 1 MOA. If the A-10 VFR pattern altitude was lowered to 1,500 feet AGL and the A-10 aircraft flew the proposed sortie-operations, wildlife could be impacted. However, as the A-10 VFR pattern altitude would only be lowered by 500 feet AGL, aircraft noise would likely contribute slightly to the wildlife impacts that would result from the increase in sortie-operations addressed in this EA.

Noise from construction activities included in the Personnel Recovery Campus EA could impact wildlife, however these activities are proposed in a very active area of the installation (i.e., the aircraft parking apron and surrounding area northwest of the Moody AFB runways). The number of events per month above 65 dBA SEL would not increase in the Moody 1 MOA under the Proposed Action analyzed in this EA. Therefore the construction activities included in the Personal Recovery Campus EA would likely contribute slightly to the wildlife impacts that would result from the increase in sortie-operations addressed in this EA.

The USFWS's formal 2001 Biological Opinion (U.S. Navy 2002) regarding authorization renewal of the Pinecastle Range for U.S. Navy use was that operations were not likely to affect the wood stork; therefore, no impacts on the wood stork would be expected. However, it was the USFWS's biological opinion that the use of the target areas at the range could result in the incidental take of the Florida scrub-jay, eastern indigo snake, and sand skink. The level of anticipated take was not likely to result in jeopardy to these species (U.S. Navy 2002).

The Florida black bear is known to forage on Pinecastle Range; however, the current operations on Pinecastle Range are thought to have minimal influence on the population of Florida black bear in the region due to their relatively large home ranges and documented distribution on the installation (U.S. Navy 2002). Large home ranges of the Florida black bear on Pinecastle Range are assumed to allow individuals to avoid target areas and still obtain food resources they need when training activities are underway. Additionally, black bear tracks are commonly observed on roads and in the vicinity of targets at the Range (U.S. Navy 2002), indicating that this species regularly traverses this area and is habituated to the existing training operations at the Pinecastle Range. Moody AFB aircraft would use Pinecastle Range but would not exceed utilization and ordnance expenditure levels assessed in the 2002 Pinecastle EIS (U.S. Navy 2002).

No significant adverse cumulative impacts on biological resources are expected from the Proposed Action in this EA combined with the projects considered for cumulative impacts in **Section 4.1**.

Hazardous Materials and Wastes. Hazardous materials and wastes could be impacted at Grand Bay Range as a result of the Range Ops project. Under the Proposed Action in this EA, there would not be an increase in ordnance use at Grand Bay Range and no impacts on hazardous materials and wastes would be expected. Therefore, no cumulative impacts on hazardous materials and wastes would be expected at Grand Bay Range.

No impacts on hazardous materials and wastes at Townsend Range are expected from the projects considered for cumulative impacts in **Section 4.1**. Therefore, no cumulative impacts on hazardous materials and wastes would be expected at Townsend Range.

4.3 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

The increase in aircraft operations would increase the use of hazardous materials, such as jet fuel, paints, and solvents, but would not impact overall management plans or capacities for handling these hazardous materials. With the increased use of hazardous materials for aircraft operations, hazardous waste would be expected to increase. This increase would not be expected to impact the management plans or capacities for handling this waste and, therefore, is not considered significant.

The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. The use of nonrenewable resources in the operations of additional aircraft would be unavoidable. Relatively small amounts of energy resources would be committed to the Proposed Action and are not considered significant.

4.4 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

The Proposed Action would not conflict with any applicable off-installation land use ordinances or designated clear zones.

4.5 Relationship Between the Short-term Use of the Environment and Long-term Productivity

Short-term uses of the biophysical components of the human environment include impacts associated with the Proposed Action that would occur over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss. Several kinds of activities could result in short-term resource uses that compromise long-term productivity. For example, filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in significant intensification of land use within the ROI or in the surrounding area.

4.6 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). The irreversible and irretrievable commitments of resources that would result from implementation of the Proposed Action involve the consumption of materials used for energy (e.g., jet fuel) and human labor. The use of these resources is considered to be permanent.

Energy resources used for the Proposed Action would be irretrievably lost. These include petroleum-based products (e.g., jet fuel) that are used in the operation of aircraft. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

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APPENDIX A

**AIRSPACE COMPONENTS AND BOMBING RANGES USED BY
OR PROPOSED FOR USE BY MOODY AFB AIRCRAFT**

Appendix A

Airspace Components and Bombing Ranges Currently use or Proposed for use by Moody AFB Aircraft

This Appendix provides detailed information on the various airspace components associated with the Proposed Action, including MOAs, LATN area, and bombing ranges used by aircraft from Moody AFB. Baseline and proposed annual sortie-operations for each airspace component are listed in **Table A-1**, the corresponding weapons expenditure rates on an existing range are shown in **Table A-2**, and the proposed increase in flare use is shown in **Table A-3**. An overview map of all airspace components associated with aircraft from Moody AFB is shown in **Figure A-1**.

The detailed information provided in **Tables A-4** through **A-15** includes the boundaries, altitude structure, times of use, and controlling and using agencies for the airspace areas analyzed in this EA. The information provided in the tables is from the U.S Department of Transportation (USDOT) publication titled *Special Use Airspace*. The information provided in **Table A-15** is from the *Environmental Impact Statement of Beddown of a Composite Wing at Moody AFB, Georgia*. **Figures A-1** through **A-13** were provided from the 2008 Arc View Digital Aeronautical Flight Information File (AVDAFIF 2008).

Table A-1. Baseline and Proposed Annual Sortie-Operations

Airspace Unit	Baseline Use ^a					Projected Use				
	<i>A-10</i>	<i>HC-130</i>	<i>HH-60</i>	<i>Other</i>	<i>Total</i>	<i>A-10</i>	<i>HC-130</i>	<i>HH-60</i>	<i>Other</i>	<i>Total</i>
Moody 1 MOA	3,760	8	0	27	3,795	6,000	0	0	110	6,110
Moody 2 North MOA	2,004	456	412	29	2,901	4,000	500	600	185	5,285
Moody 2 South MOA	2,004	456	412	29	2,901	4,000	500	600	169	5,269
Moody 3 MOA	1,962	0	0	421	2,383	1,840	0	0	572	2,412
Live Oak MOA	572	0	0	44	616	1,450	0	0	60	1,510
Bulldog A MOA	312	0	0	2,075	2,387	500	0	0	2,075	2,575
Bulldog B MOA	168	0	0	1,785	1,953	500	0	0	1,785	2,285
Coastal 1 East MOA ^b	764	0	0	1,840	2,604	2,000	0	0	1,840	3,840
Coastal 1 West MOA ^b	764	0	0	1,840	2,604	2,000	0	0	1,840	3,840
Grand Bay Range (R-3008)	2,964	229	337	5	3,535	5,000	500	600	400	6,500
Townsend Range (R-3007)	764	0	0	4,000	4,764	2,000	0	0	4,000	6,000
LATN Area	5,000	575	1,140	0	6,715	5,000	600	1,200	0	6,800
Total	21,038	1,724	2,301	12,095	37,158	34,290	2,100	3,000	13,036	52,426

Notes:

a. Source: Moody AFB 2006

b. Source: FAA 2008

Table A-2. Baseline and Proposed Annual Ordnance Use at Townsend Range

Ordnance Type	<i>Baseline Use</i>	<i>Proposed Use</i>
BDU-33	8,600	10,600
BDU-50/MK-82	641	691
MK-83	93	93
BDU-56/MK-84	76	76
7.62-mm	145,000	145,000
20-mm	25,000	25,000
30-mm	83,500	283,500
2.75-inch Rockets	388	1,388
Total	263,298	466,348

Notes: Numbers of annual ordnance use are total range numbers and include non-Moody AFB aircraft usage.

Key:

BDU = bomb dummy unit

mm = millimeter

MK = mark

Table A-3. Baseline and Proposed Annual Flare Use

Airspace Unit	Flare Use	
	<i>Baseline Use ^a</i>	<i>Proposed Use</i>
Moody 2 North MOA	0	5,000
Moody 2 South MOA	0	5,000
Total	0	10,000

Note:

a. Source: Lopez 2011a

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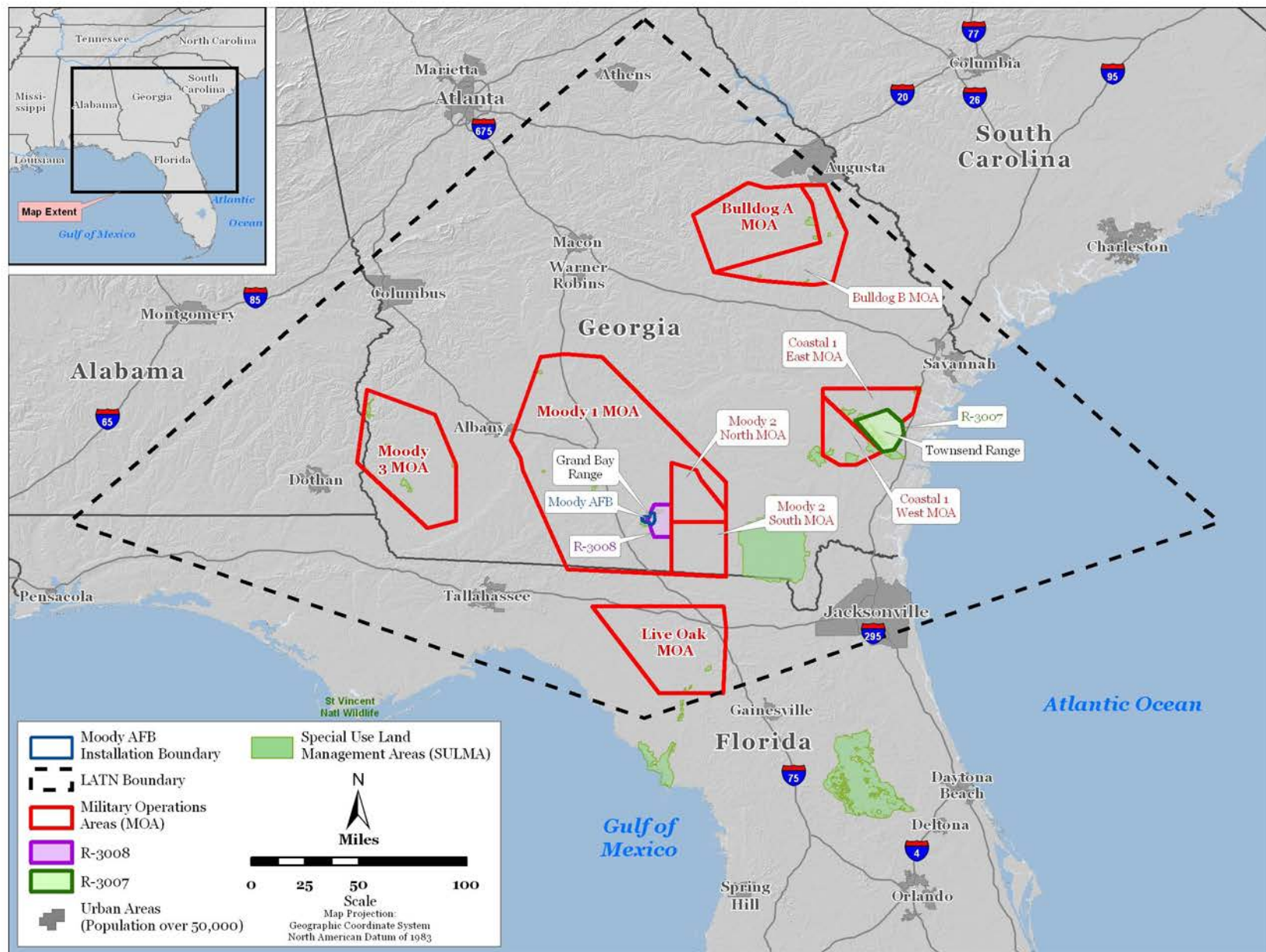


Figure A-1. Assessed Airspace Components and Bombing Ranges Used by Moody AFB Aircraft

Table A-4. Moody 1 MOA

Moody 1 MOA
<p>Moody 1 MOA, GA</p> <p>Boundaries. Beginning at lat. 32°03'46"N., long. 83°29'00"W.; to lat. 31°13'01"N., long. 82°39'00"W.; to lat. 30°35'01"N., long. 82°38'59"W.; to lat. 30°38'01"N., long. 83°43'00"W.; to lat. 31°18'01"N., long. 84°01'10"W.; to lat. 31°22'46"N., long. 84°02'00"W.; to lat. 31°30'01"N., long. 84°06'00"W.; to lat. 32°03'46"N., long. 83°54'00"W.; to lat. 32°05'01"N., long. 83°44'15"W.; to the point of beginning.</p> <p>Altitudes. 8,000 feet MSL to but not including FL 180.</p> <p>Times of use. 0600-0200 Monday-Friday; other times by NOTAM.</p> <p>Controlling agency. FAA, Jacksonville ARTCC</p> <p>Using agency. U.S. Air Force, U.S. Air Force, 23rd Wing, Moody AFB, GA</p> <p>USING AGENCY CHANGED 1/18/07</p>

Source: USDOT 2007

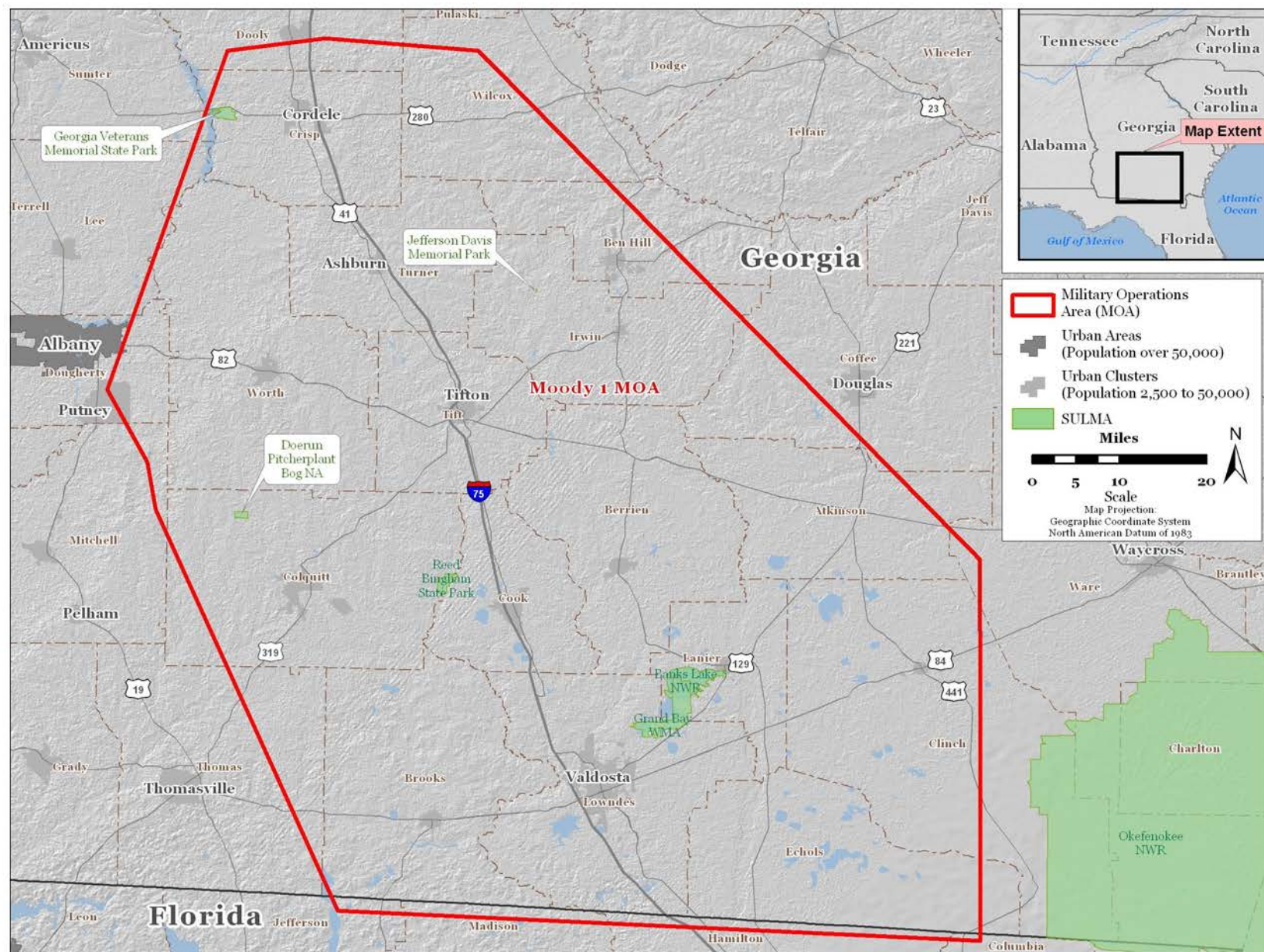
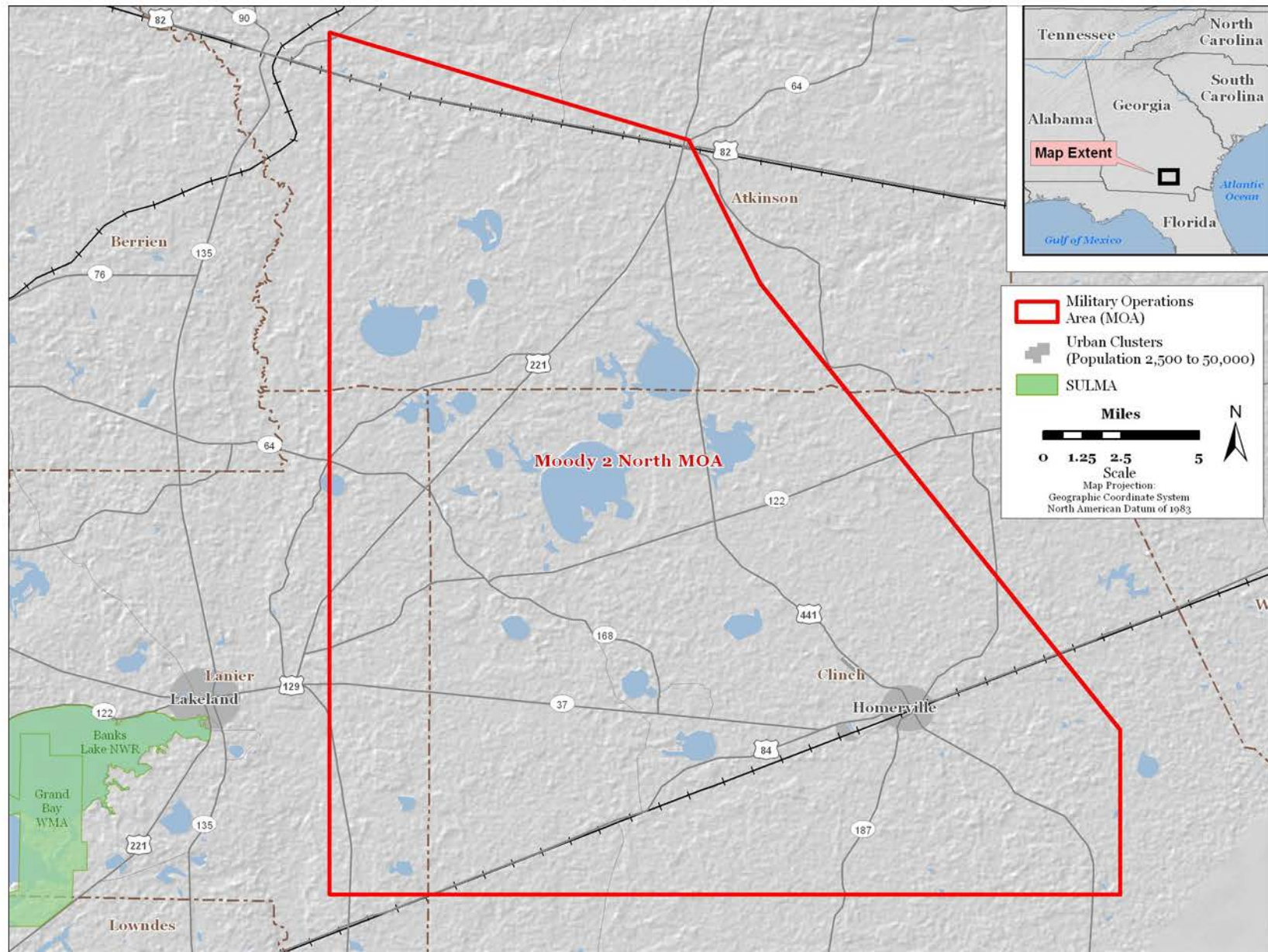


Figure A-2. Moody 1 MOA

Table A-5. Moody 2 North NOA

Moody 2 North MOA, GA
<p>Boundaries. Beginning at lat. 31°18'01"N., long. 82°51'00"W.; to lat. 31°14'01"N., long. 82°49'00"W.; to lat. 31°01'36"N., long. 82°39'00"W.; to lat. 30°57'01"N., long. 82°39'00"W.; to lat. 30°57'01"N., long. 83°01'00"W.; to lat. 31°21'01"N., long. 83°01'00"W.; to the point of beginning.</p> <p>Altitudes. 500 feet AGL to but not including 8,000 feet MSL.</p> <p>Times of use. 0600-0200 Monday-Friday; other times by NOTAM.</p> <p>Controlling agency. FAA, Jacksonville ARTCC</p> <p>Using agency. U.S. Air Force, U.S. Air Force, 23rd Wing, Moody AFB, GA</p> <p>USING AGENCY CHANGED 1/18/07</p>

Source: USDOT 2007



Source of MOA: AVDAFIF Edition 8, September 2008.

Figure A-3. Moody 2 North MOA

Table A-6. Moody 2 South MOA

Moody 2 South MOA, GA
<p>Boundaries. Beginning at lat. 30°57'01"N., long. 83°01'00"W.; to lat. 30°57'01"N., long. 82°39'00"W.; to lat. 30°35'01"N., long. 82°39'00"W.; to lat. 30°36'11"N., long. 83°01'00"W.; to the point of beginning.</p> <p>Altitudes. 100 feet AGL to but not including 8,000 feet MSL.</p> <p>Times of use. 0600-0200 Monday-Friday; other times by NOTAM.</p> <p>Controlling agency. FAA, Jacksonville ARTCC</p> <p>Using agency. U.S. Air Force, U.S. Air Force, 23rd Wing, Moody AFB, GA</p> <p>USING AGENCY CHANGED 1/18/07</p>

Source: USDOT 2007

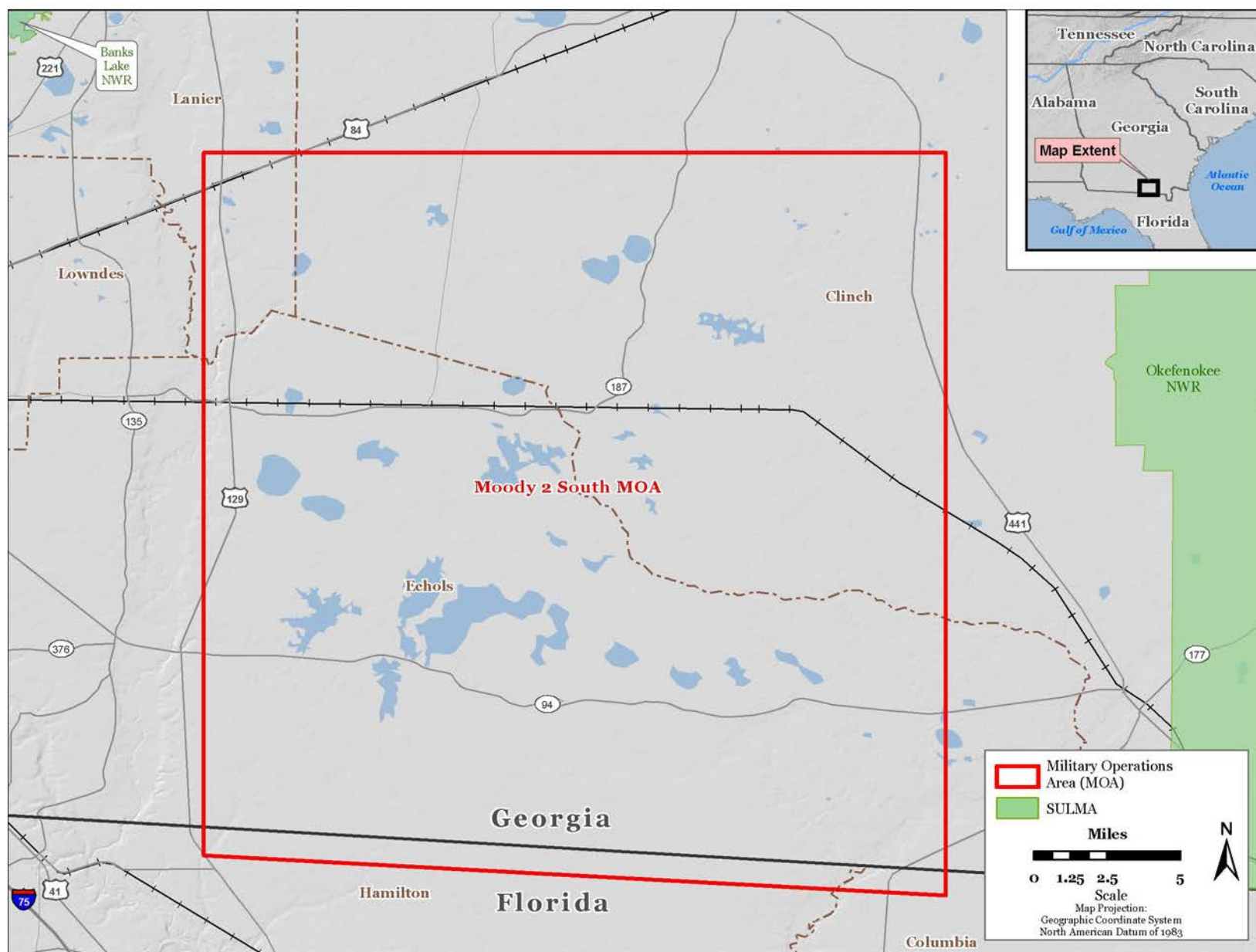


Figure A-4. Moody 2 South MOA

Table A-7. Moody 3 MOA

Moody 3 MOA, GA
<p>Boundaries. Beginning at lat. 31°40'31"N., long. 84°36'30"W.; to lat. 31°20'01"N., long. 84°28'00"W.; to lat. 30°57'41"N., long. 84°28'00"W.; to lat. 30°54'41"N., long. 84°39'30"W.; to lat. 31°21'01"N., long. 85°08'00"W.; to lat. 31°50'31"N., long. 85°04'00"W.; to the point of beginning.</p> <p>Altitudes. 8,000 feet MSL to but not including FL 180.</p> <p>Times of use. 0600-0200 Monday-Friday; other times by NOTAM.</p> <p>Controlling agency. FAA, Jacksonville ARTCC</p> <p>Using agency. U.S. Air Force, U.S. Air Force, 23rd Wing, Moody AFB, GA</p> <p>USING AGENCY CHANGED 1/18/07</p>

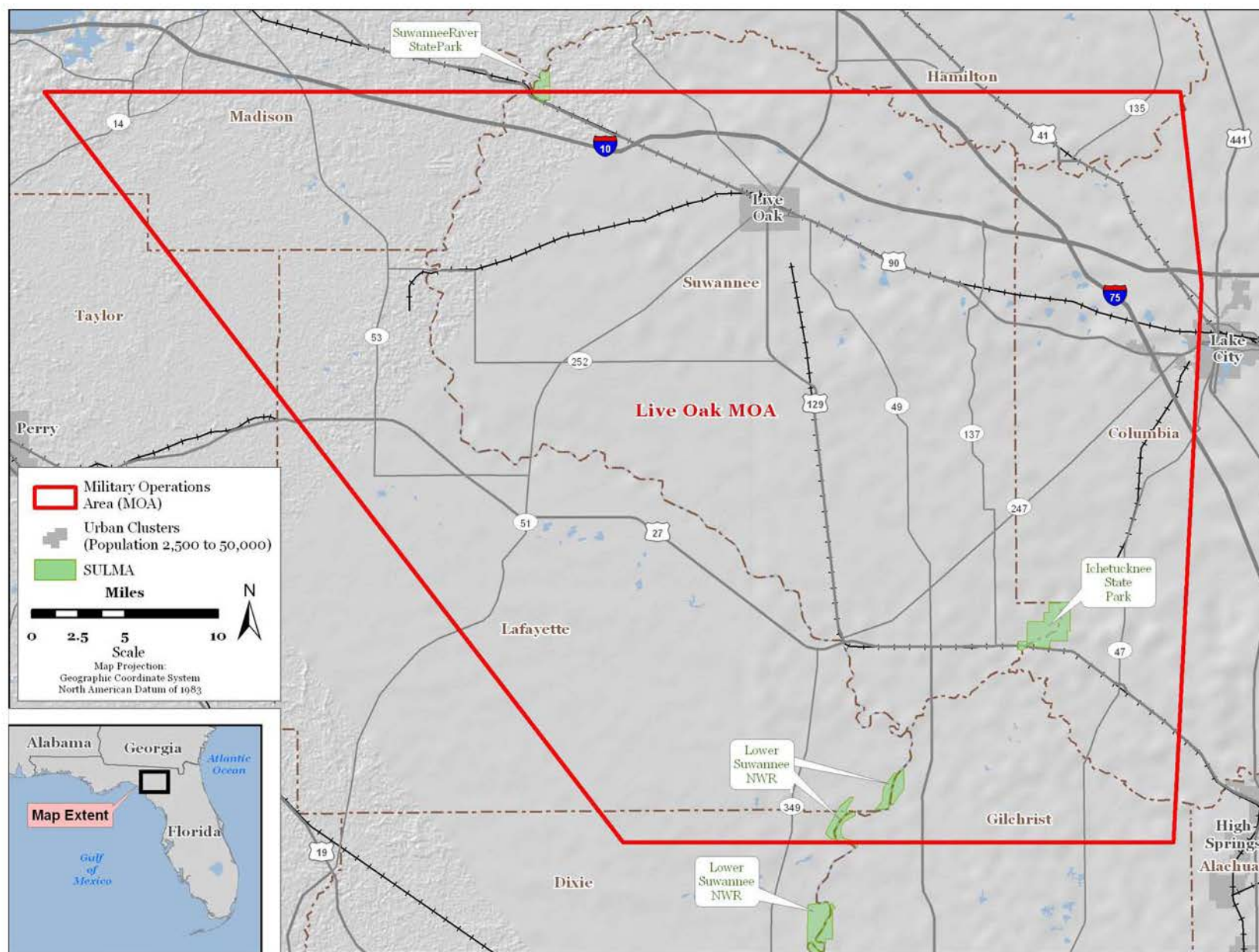
Source: USDOT 2007

Figure A-5. Moody 3 MOA

Table A-8. Live Oak MOA

Live Oak MOA, FL
<p>Boundaries. Beginning at lat. 30°23'01"N., long. 82°39'59"W.; to lat. 30°14'01"N., long. 82°38'59"W.; to lat. 29°48'01"N., long. 82°40'19"W.; to lat. 29°48'01"N., long. 83°05'59"W.; to lat. 30°23'01"N., long. 83°33'00"W.; to the point of beginning.</p> <p>Altitudes. 8,000 feet MSL to but not including FL 180.</p> <p>Times of use. 0600-0200 Monday-Friday; other times by NOTAM.</p> <p>Controlling agency. FAA, Jacksonville ARTCC.</p> <p>Using agency. U.S. Air Force, U.S. Air Force, 23rd Wing, Moody AFB, GA.</p> <p>USING AGENCY CHANGED 1/18/07</p>

Source: USDOT 2007



Source of MOA: AVDAFIF Edition 8, September 2008.

Figure A-6. Live Oak MOA

Table A-9. Bulldog A MOA

Bulldog A MOA, GA
<p>Boundaries. Beginning at lat. 33°01'01"N., long. 82°52'30"W.; to lat. 33°14'01"N., long. 82°29'59"W.; to lat. 33°12'01"N., long. 82°22'59"W.; to lat. 33°13'01"N., long. 82°08'59"W.; to lat. 33°05'46"N., long. 82°04'29"W.; to lat. 32°50'01"N., long. 82°00'59"W.; to lat. 32°37'51"N., long. 82°43'59"W.; to the point of beginning.</p> <p>Altitudes. 500 feet AGL to but not including 10,000 feet MSL, excluding those areas at and below 1,500 feet AGL, described as: (1) Beginning at lat. 33°14'01"N., long. 82°29'59"W.; to lat. 33°12'01"N., long. 82°22'59"W.; to lat. 33°12'16"N., long. 82°19'34"W.; thence via a 3-NM arc centered at lat. 33°12'26"N., long. 82°23'09"W.; to lat. 33°09'58"N., long. 82°25'12"W.; to lat. 33°13'26"N., long. 82°31'29"W.; to the point of beginning. (2) Beginning at lat. 33°01'01"N., long. 82°52'30"W.; to lat. 33°03'19"N., long. 82°48'38"W.; to lat. 32°58'01"N., long. 82°46'14"W.; to lat. 32°51'00"N., long. 82°48'49"W.; to the point of beginning. (3) A 3-NM arc centered at lat. 32°59'00"N., long. 82°23'00"W.</p> <p>Times of use. Intermittent, 0700-2400 daily; other times by NOTAM.</p> <p>Controlling agency. FAA, Atlanta ARTCC.</p> <p>Using agency. U.S. Air Force, 20th Fighter Wing, Shaw AFB, SC.</p> <p>TIMES OF USE CHANGED 1/23/03</p>

Source: USDOT 2007

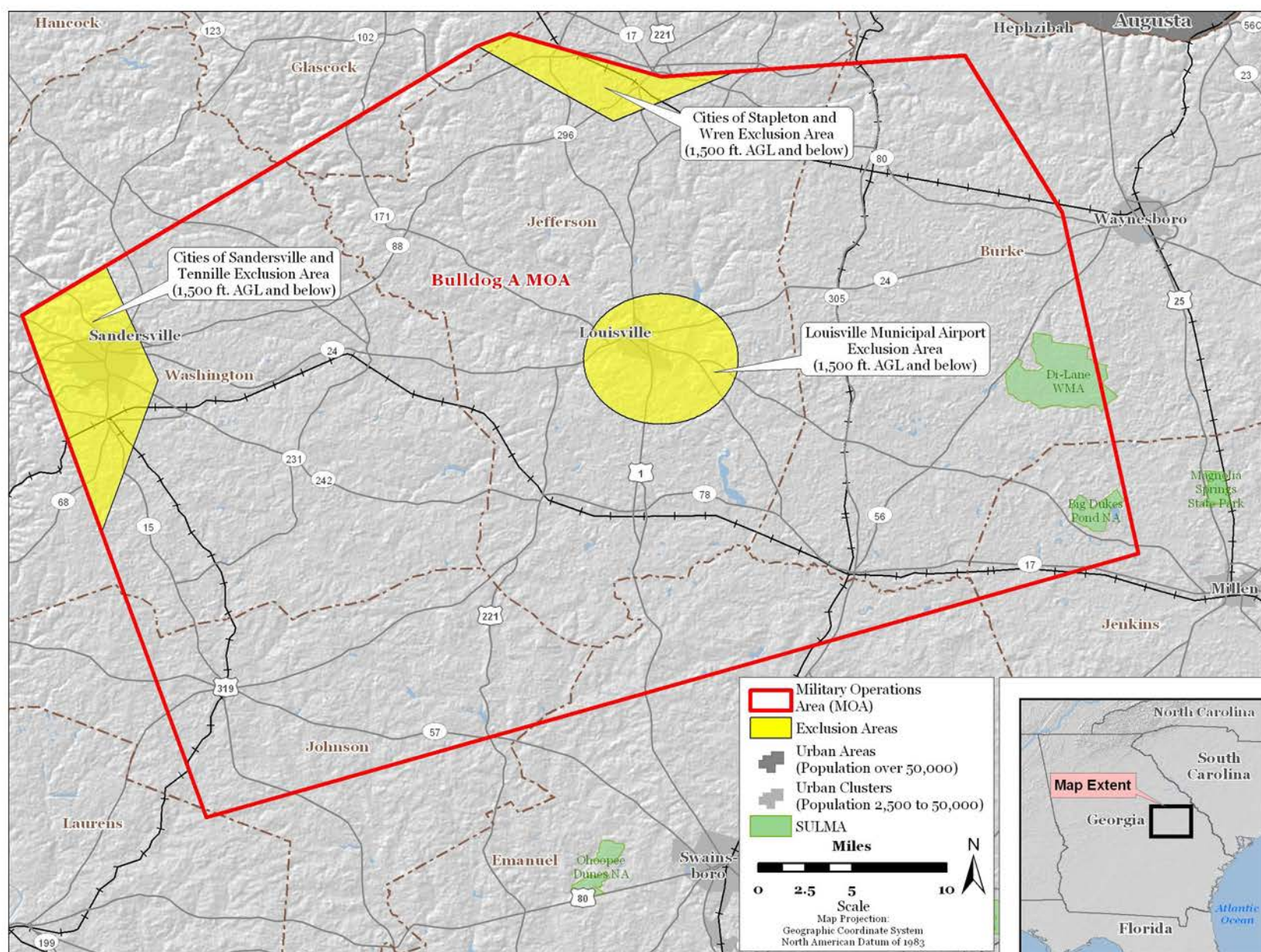


Figure A-7. Bulldog A MOA

Table A-10. Bulldog B MOA

Bulldog B MOA, GA
<p>Boundaries. Beginning at lat. 33°14'01"N., long. 82°29'59"W.; to lat. 33°12'01"N., long. 82°22'59"W.; to lat. 33°13'01"N., long. 82°08'59"W.; to lat. 33°13'01"N., long. 81°58'59"W.; to lat. 32°54'01"N., long. 81°50'29"W.; to lat. 32°34'01"N., long. 81°55'59"W.; to lat. 32°33'46"N., long. 81°57'49"W.; to lat. 32°32'46"N., long. 82°03'44"W.; to lat. 32°34'31"N., long. 82°25'29"W.; to lat. 32°37'51"N., long. 82°43'59"W.; to lat. 33°01'01"N., long. 82°52'30"W.; to lat. 33°13'26"N., long. 82°31'29"W.; to the point of beginning.</p> <p>Altitudes. 10,000 feet MSL up to but not including FL 180.</p> <p>Times of use. Intermittent, 0700-2400 daily; other times by NOTAM.</p> <p>Controlling agency. FAA, Atlanta ARTCC.</p> <p>Using agency. U.S. Air Force, 20th Fighter Wing, Shaw AFB, SC</p> <p>TIMES OF USE CHANGED 1/23/03</p>

Source: USDOT 2007

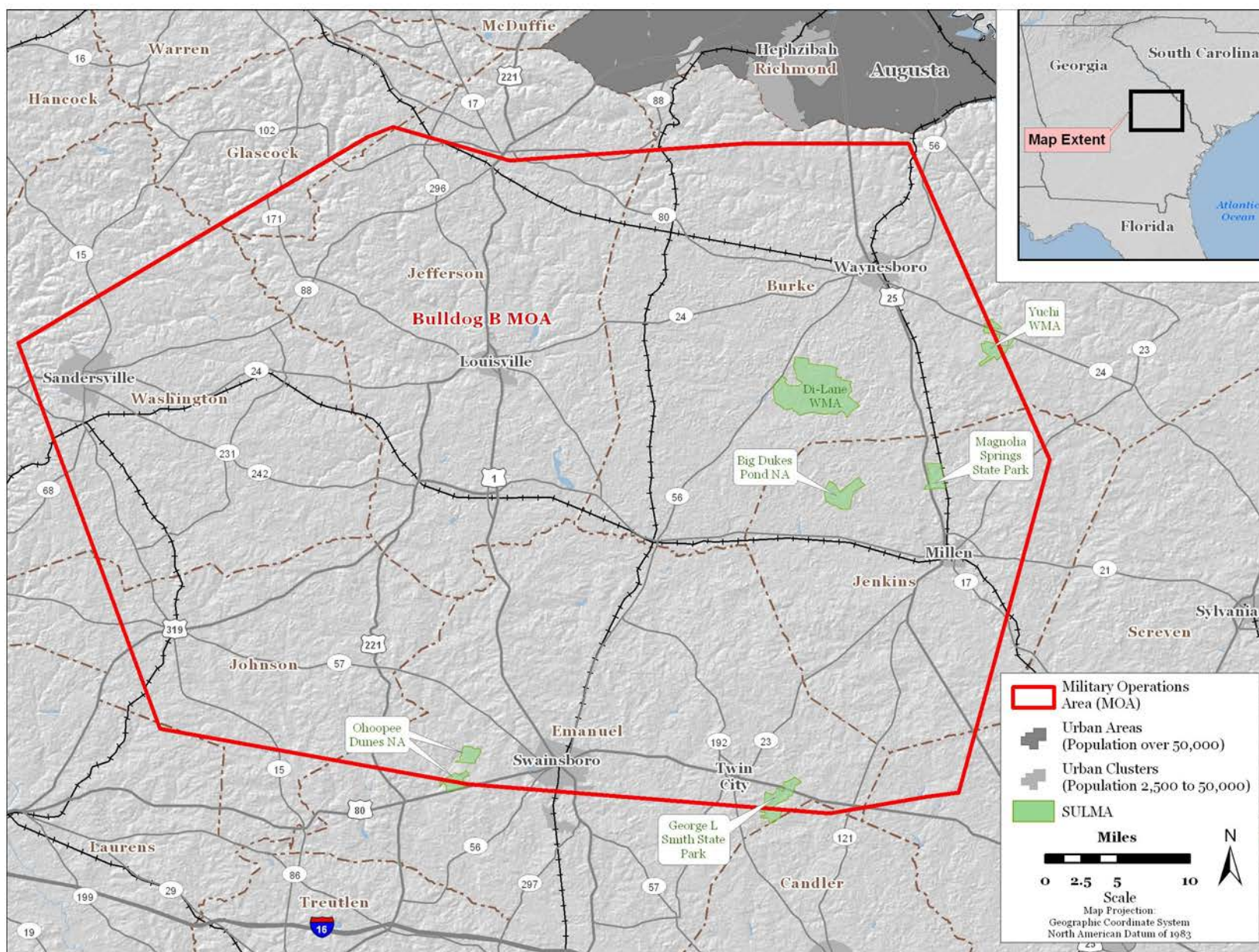


Figure A-8. Bulldog B MOA

Table A-11. Townsend Range (R-3007)

Townsend Range (R-3007)	
<p>R-3007A Townsend, GA Boundaries. A circular area with a 1.5-mile radius centered at lat. 31°33'16"N., long. 81°34'44"W. Designated altitudes. Surface to but not including 13,000 feet MSL. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM at least 24 hours in advance. Controlling agency. FAA, Jacksonville ARTCC. Using agency. ANG, Savannah Combat Readiness Training Center, GA.</p> <p>AMENDMENTS 8/3/06 71 FR 29247 (Revised)</p>	<p>R-3007B Townsend, GA Boundaries. Beginning at lat. 31°38'01"N., long. 81°28'59"W.; to lat. 31°37'31"N., long. 81°28'14"W.; to lat. 31°32'31"N., long. 81°27'29"W.; to lat. 31°26'16"N., long. 81°31'29"W.; to lat. 31°25'31"N., long. 81°35'59"W.; to lat. 31°27'26"N., long. 81°33'39"W.; to lat. 31°31'26"N., long. 81°31'58"W.; thence clockwise along a 1 NM radius arc from a point centered at lat. 31°32'26"N., long. 81°31'49"W.; to lat. 31°33'18"N., long. 81°31'13"W.; to the point of beginning. Designated altitudes. 1,200 feet AGL to but not including 13,000 feet MSL. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM at least 24 hours in advance. Controlling agency. FAA, Jacksonville ARTCC. Using agency. ANG, Savannah Combat Readiness Training Center, GA.</p> <p>AMENDMENTS 8/3/06 71 FR 29247 (Revised)</p>
<p>R-3007C Townsend, GA Boundaries. Beginning at lat. 31°38'01"N., long. 81°46'59"W.; to lat. 31°42'31"N., long. 81°33'59"W.; to lat. 31°38'01"N., long. 81°28'59"W.; to lat. 31°33'18"N., long. 81°31'13"W.; thence counterclockwise along a 1 NM radius arc from a point centered at lat. 31°32'26"N., long. 81°31'49"W.; to lat. 31°31'26"N., long. 81°31'58"W.; to lat. 31°27'26"N., long. 81°33'39"W.; to lat. 31°25'31"N., long. 81°35'59"W.; thence west along the Altamaha River to the point of beginning; excluding R-3007A. Designated altitudes. 100 feet AGL to but not including 13,000 feet MSL. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM at least 24 hours in advance. Controlling agency. FAA, Jacksonville ARTCC. Using agency. ANG, Savannah Combat Readiness Training Center, GA.</p> <p>AMENDMENTS 8/3/06 71 FR 29247 (Revised)</p>	<p>R-3007D Townsend, GA Boundaries. Beginning at lat. 31°38'01"N., long. 81°46'59"W.; to lat. 31°42'31"N., long. 81°33'59"W.; to lat. 31°38'01"N., long. 81°28'59"W.; to lat. 31°37'31"N., long. 81°28'14"W.; to lat. 31°32'31"N., long. 81°27'29"W.; to lat. 31°26'16"N., long. 81°31'29"W.; to lat. 31°25'31"N., long. 81°35'59"W.; thence northwest along the Altamaha River to the point of beginning. Designated altitudes. 13,000 feet MSL to FL 250. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM at least 24 hours in advance. Controlling agency. FAA, Jacksonville ARTCC. Using agency. ANG, Savannah Combat Readiness Training Center, GA.</p> <p>AMENDMENTS 8/3/06 71 FR 29247 (Revised)</p>

Source: USDOT 2007

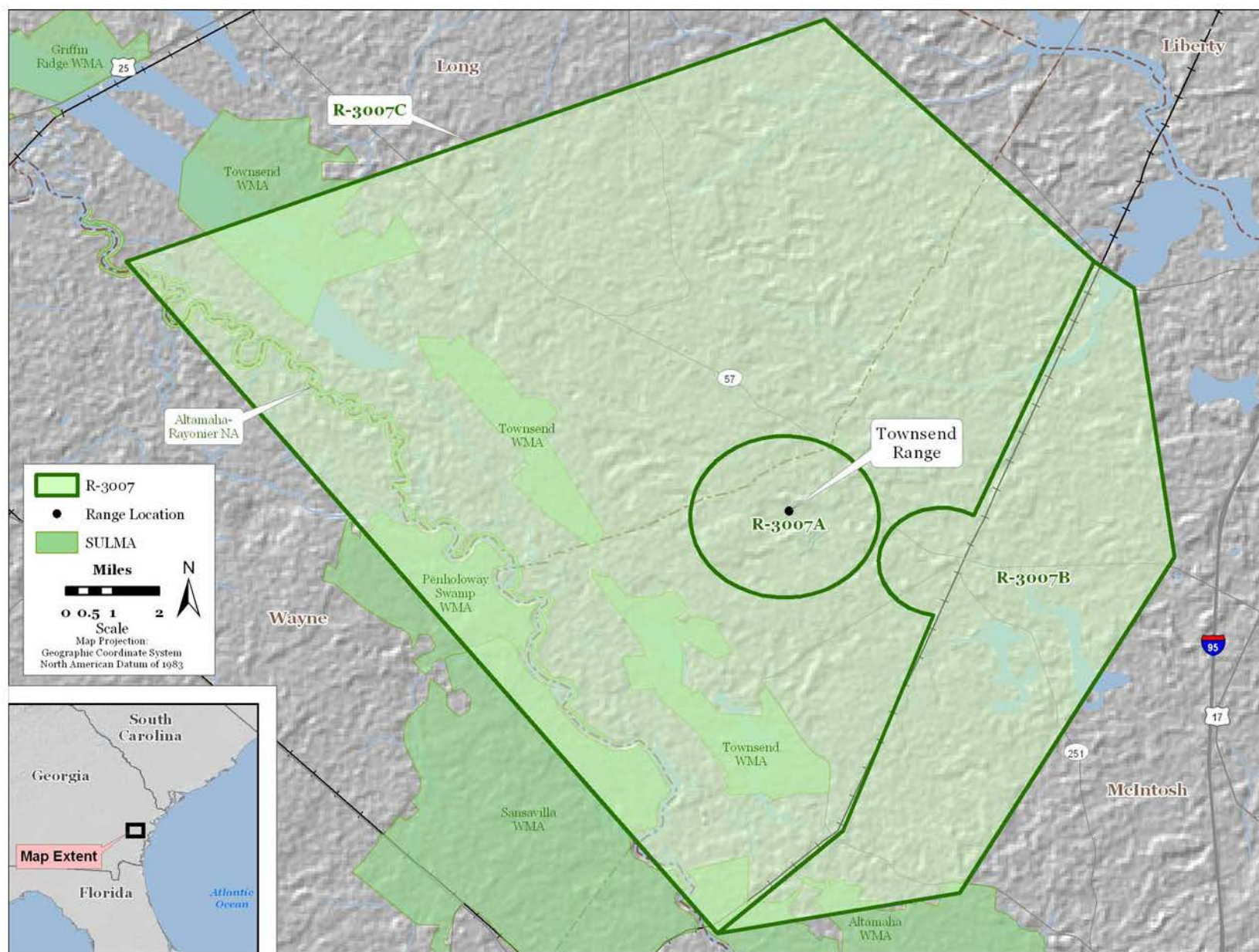
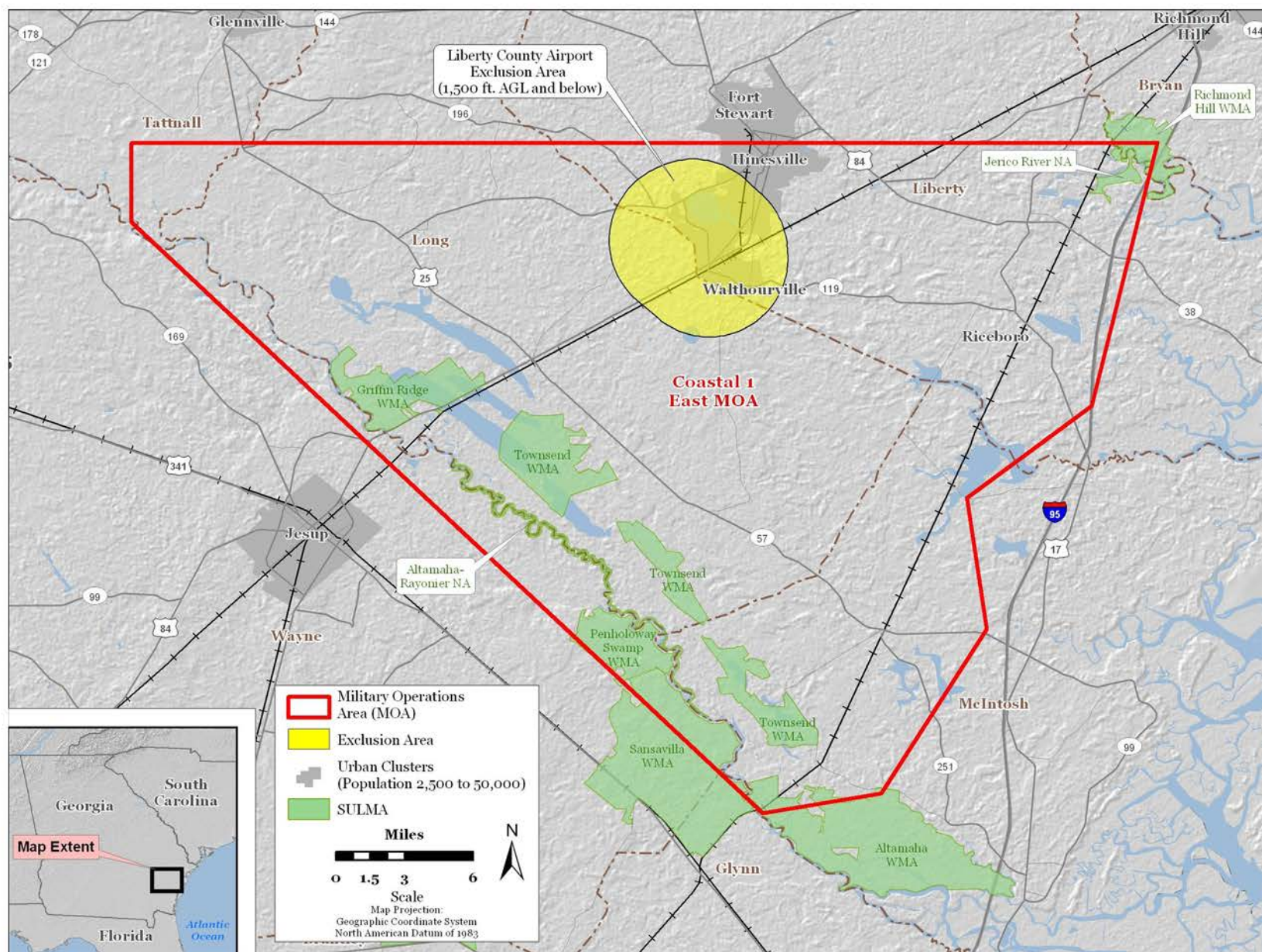


Figure A-9. Townsend Range (R-3007)

Table A-12. Coastal 1 East MOA

Coastal 1 East MOA, GA
<p>Boundaries. Beginning at lat. 31°51'01"N., long. 81°20'59"W.; to lat. 31°41'01"N., long. 81°23'30"W.; to lat. 31°37'31"N., long. 81°28'14"W.; to lat. 31°32'31"N., long. 81°27'29"W.; to lat. 31°26'16"N., long. 81°31'29"W.; to lat. 31°25'31"N., long. 81°35'59"W.; thence northwest along the Altamaha River to lat. 31°47'59"N., long. 81°59'59"W.; to lat. 31°51'01"N., long. 81°59'59"W.; to the point of beginning. Excluding R-3007 and the Wright Army Airfield (LHW) Class D airspace when activated; and excluding the airspace 1,500 feet AGL and below within a 3 NM radius of Liberty County Airport (2J2).</p> <p>Altitudes. 300 feet AGL to but not including FL 180.</p> <p>Times of use. Intermittent 0700-2200 Monday-Friday; Intermittent 0700-2200 by NOTAM Saturday and Sunday. (NOTE: not to exceed 665 hours per year).</p> <p>Controlling agency. FAA, Jacksonville ARTCC.</p> <p>Using agency. ANG, Savannah Combat Readiness Training Center, GA</p> <p>ADDED 8/03/06</p>

Source: USDOT 2007



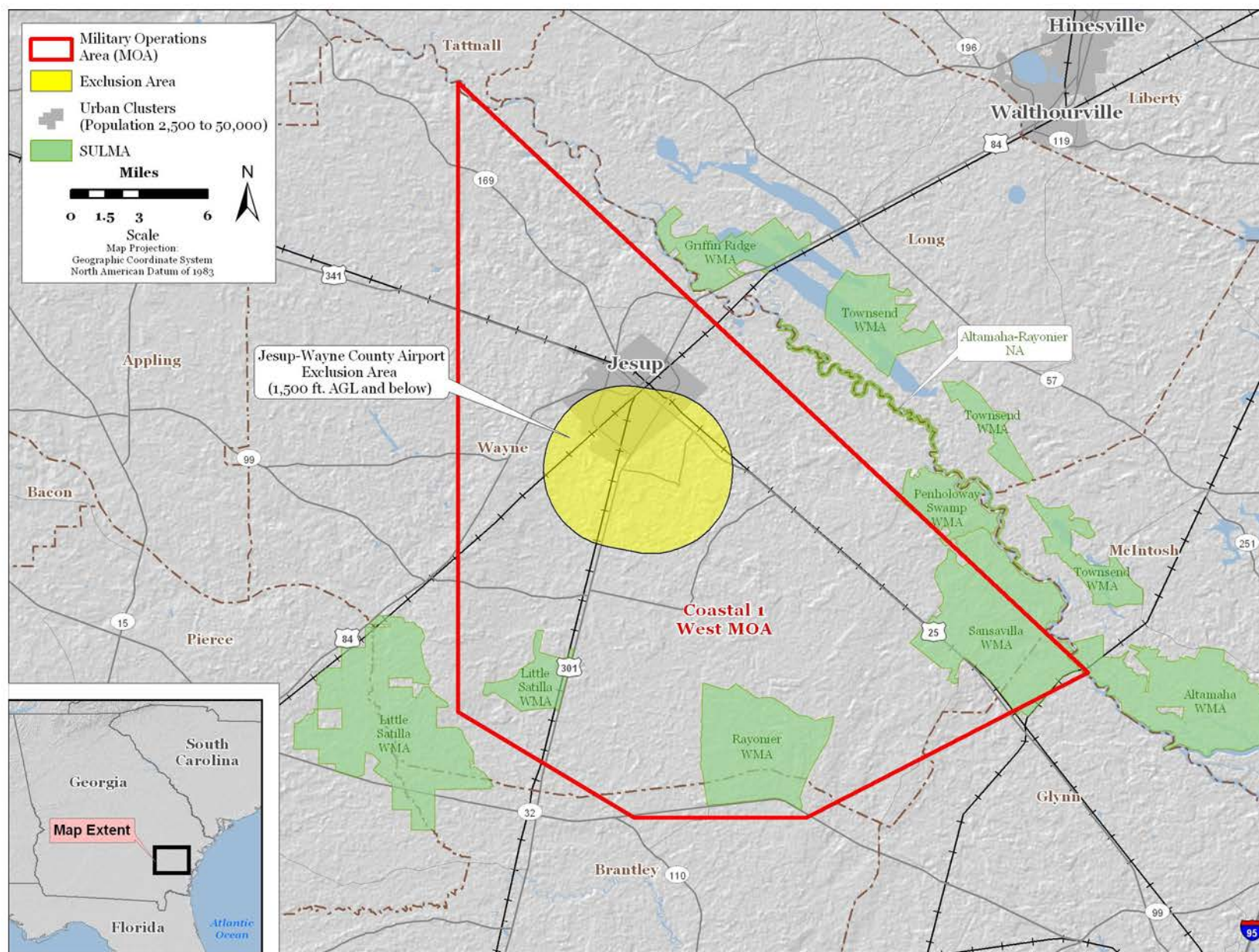
Sources: MOA: AVDAFIF Edition 8, September 2008. Exclusion Area: e* M, Inc. 2009.

Figure A-10. Coastal 1 East MOA

Table A-13. Coastal 1 West MOA

Coastal 1 West MOA, GA
<p>Boundaries. Beginning at lat. 31°25'31"N., long. 81°35'59"W.; thence northwest along the Altamaha River to lat. 31°47'59"N., long. 81°59'59"W.; to lat. 31°24'01"N., long. 81°59'59"W.; to lat. 31°19'59"N., long. 81°53'16"W.; to lat. 31°19'59"N., long. 81°46'44"W.; to lat. 31°25'31"N., long. 81°35'59"W.; to the point of beginning. Excluding the airspace 1,500 feet AGL and below within a 3 NM radius of Jesup-Wayne County Airport (JES).</p> <p>Altitudes. 300 feet AGL to but not including FL 180.</p> <p>Times of use. Intermittent 0700-2200 Monday-Friday; Intermittent 0700-2200 by NOTAM Saturday and Sunday. (NOTE: not to exceed 665 hours per year).</p> <p>Controlling agency. FAA, Jacksonville ARTCC.</p> <p>Using agency. ANG, Savannah Combat Readiness Training Center, GA</p> <p>ADDED 8/03/06</p>

Source: USDOT 2007



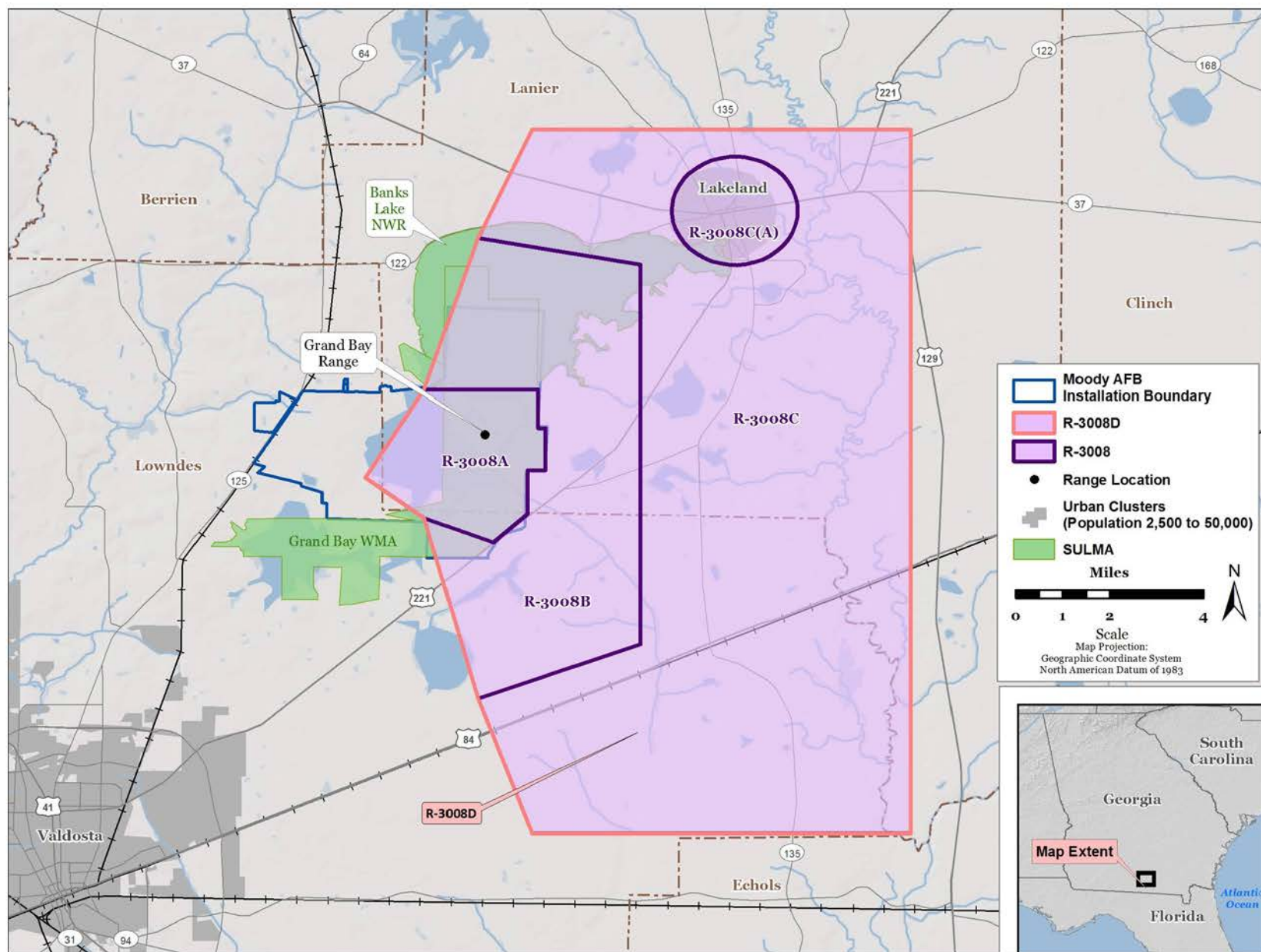
Sources: MOA: AVDAFIF Edition 8, September 2008; Exclusion Area: e*M, Inc. 2009.

Figure A-11. Coastal 1 West MOA

Table A-14. Grand Bay Range (R-3008)

Grand Bay Range (R-3008)	
<p>R-3008A Grand Bay Weapons Range, GA Boundaries. Beginning at lat. 30°57'36"N., long. 83°11'05"W.; to lat. 30°59'13"N., long. 83°10'00"W.; to lat. 30°59'13"N., long. 83°07'53"W.; to lat. 30°58'31"N., long. 83°07'53"W.; to lat. 30°58'31"N., long. 83°07'45"W.; to lat. 30°57'44"N., long. 83°07'45"W.; to lat. 30°57'44"N., long. 83°08'05"W.; to lat. 30°56'56"N., long. 83°08'05"W.; to lat. 30°56'24"N., long. 83°08'43"W.; to lat. 30°56'51"N., long. 83°10'00"W.; to the point of beginning. Designated altitudes. Surface to 10,000 feet MSL. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM 6 hours in advance. Controlling agency. U.S. Air Force, Valdosta Approach Control. Using agency. U.S. Air Force, 23rd Wing, Moody AFB, GA.</p> <p>AMENDMENTS 1/18/07 71 FR 67783 (Amended)</p>	<p>R-3008B Grand Bay Weapons Range, GA Boundaries. Beginning at lat. 30°59'13"N., long. 83°10'00"W.; to lat. 31°02'01"N., long. 83°09'00"W.; to lat. 31°01'31"N., long. 83°06'00"W.; to lat. 30°54'31"N., long. 83°06'00"W.; to lat. 30°53'31"N., long. 83°09'00"W.; to lat. 30°56'51"N., long. 83°10'00"W.; to lat. 30°56'24"N., long. 83°08'43"W.; to lat. 30°56'56"N., long. 83°08'05"W.; to lat. 30°57'44"N., long. 83°08'05"W.; to lat. 30°57'44"N., long. 83°07'45"W.; to lat. 30°58'31"N., long. 83°07'45"W.; to lat. 30°58'31"N., long. 83°07'53"W.; to lat. 30°59'13"N., long. 83°07'53"W.; to the point of beginning. Designated altitudes. 100 feet AGL to 10,000 feet MSL. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM 6 hours in advance. Controlling agency. U.S. Air Force, Valdosta Approach Control. Using agency. U.S. Air Force, 23rd Wing, Moody AFB, GA.</p> <p>AMENDMENTS 1/18/07 71 FR 67783 (Amended)</p>
<p>R-3008C Grand Bay Weapons Range, GA Boundaries. Beginning at lat. 31°04'01"N., long. 83°01'00"W.; to lat. 31°04'01"N., long. 83°08'00"W.; to lat. 31°02'01"N., long. 83°09'00"W.; to lat. 31°01'31"N., long. 83°06'00"W.; to lat. 30°54'31"N., long. 83°06'00"W.; to lat. 30°53'31"N., long. 83°09'00"W.; to lat. 30°51'01"N., long. 83°08'00"W.; to lat. 30°51'01"N., long. 83°01'00"W.; to the point of beginning. Designated altitudes. 500 feet AGL to 10,000 feet MSL, excluding that airspace below 1,500 feet AGL within one nautical mile of Lakeland, GA. (One-nautical-mile radius centered at lat. 31°02'31"N., long. 83°04'15"W.) Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM 6 hours in advance. Controlling agency. U.S. Air Force, Valdosta Approach Control. Using agency. U.S. Air Force, 23rd Wing, Moody AFB, GA.</p> <p>AMENDMENTS 1/18/07 71 FR 67783 (Amended)</p>	<p>R-3008D Grand Bay Weapons Range, GA Boundaries. Beginning at lat. 31°04'01"N., long. 83°01'00"W.; to lat. 30°51'01"N., long. 83°01'00"W.; to lat. 30°51'01"N., long. 83°08'00"W.; to lat. 30°53'31"N., long. 83°09'00"W.; to lat. 30°56'51"N., long. 83°10'00"W.; to lat. 30°57'36"N., long. 83°11'05"W.; to lat. 30°59'13"N., long. 83°10'00"W.; to lat. 31°02'01"N., long. 83°09'00"W.; to lat. 31°04'01"N., long. 83°08'00"W.; to the point of beginning. Designated altitudes. 10,000 feet MSL to but not including FL 230. Time of designation. 0700-2200 local time, Monday-Friday; other times by NOTAM 6 hours in advance. Controlling agency. U.S. Air Force, Valdosta Approach Control. Using agency. U.S. Air Force, 23rd Wing, Moody AFB, GA.</p> <p>AMENDMENTS 1/18/07 71 FR 67783 (Amended)</p>

Source: USDOT 2007



Sources: R-3008: AVDAFIF Edition 8, September 2008; Noise Contour and Range Location: e*TM, Inc. 2009.

Figure A-12. Grand Bay Range (R-3008)

Table A-15. LATN Area

Corner Points	Latitude/Longitude	Altitude Structure (feet)
A	34°20'00"/83°12'00"	100 to 1,500 AGL
B	30°57'00"/79°20'00"	100 to 1,500 AGL
C	29°38'00"/83°12'00"	100 to 1,500 AGL
D	30°57'00"/87°04'00"	100 to 1,500 AGL

Source: Moody AFB 1992

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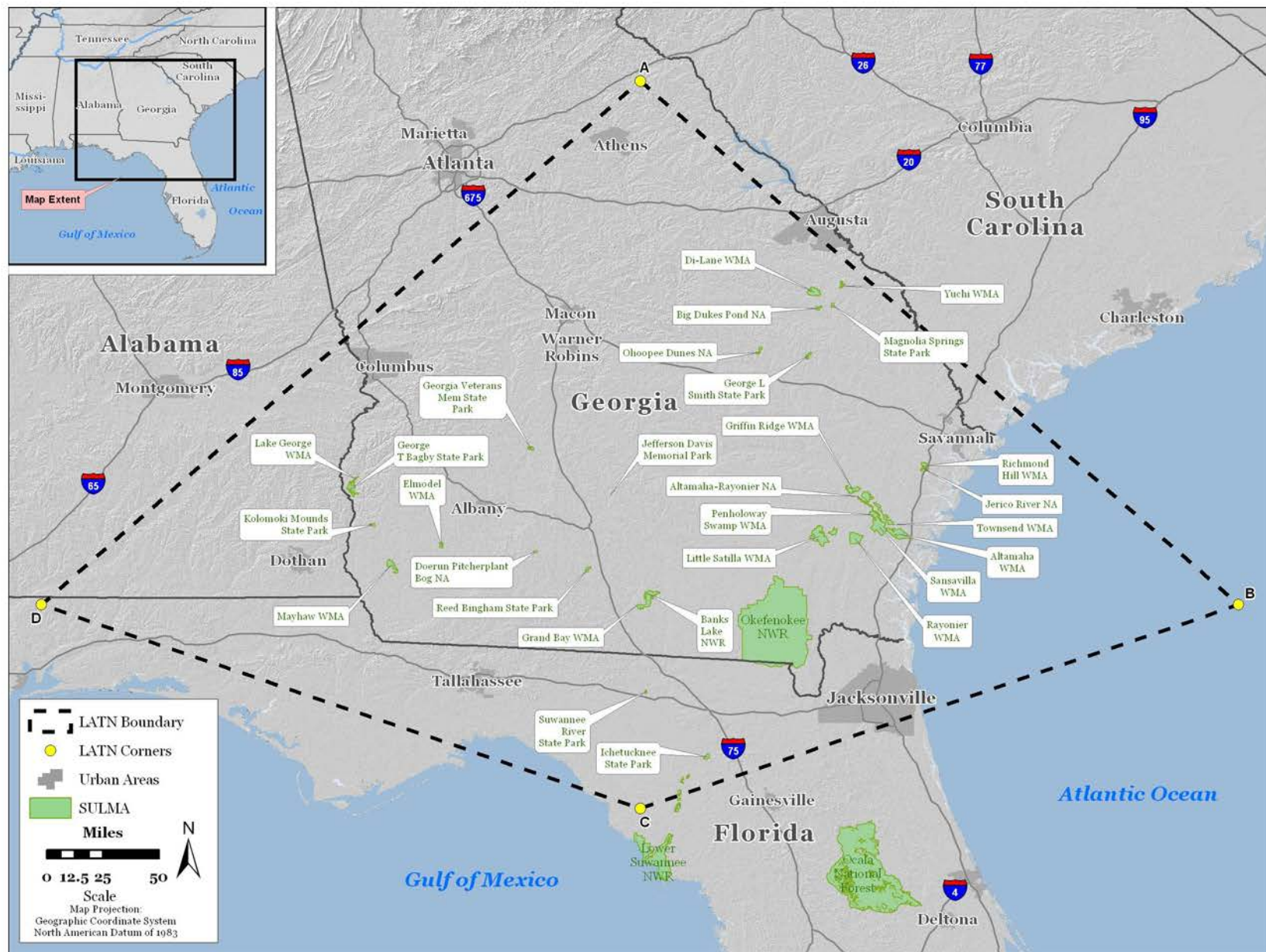


Figure A-13. LATN Area

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**AIRSPACE SORTIE-OPERATIONS UTILIZATION FILES
(EXCEL WORKBOOK)**

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Airspace Operations

Note: The operational data came from a combination of the following sources. Substitute aircraft were chosen for the noise and air quality analyses because several of the aircraft shown below were not available. The substitutions were made based on similar engine types and aircraft sizes.

Moody AFB. 2006. *Base Realignment and Closure Commission (BRAC) Environmental Assessment Moody Air Force Base, Georgia*. Appendix C. September 2006. 23rd Wing (23 WG). 2008. *23rd Wing, Moody AFB, GA FY08 Airspace Utilization Breakdown (others)*.

Federal Aviation Administration (FAA). 2008. *Restricted Area/Military Operations Area Utilizations Report (RCS: 1412-DOT-AN)*. 1 October 2007–30 September 2008.

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Reviewed 12 Nov 2010 by Airspace Manager

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Original Aircraft Type	Grandy Bay Range (R-3008 A-D)																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Time spent in airspace per sortie (minutes)	Average % Power Setting	Indicated Airspeed (knots)	100-499 ft AGL Day	100-499 ft AGL Night	500-999 ft AGL Day	500-999 ft AGL Night	1000-2999 ft MSL Day	1000-2999 ft MSL Night	3000-4999 ft MSL Day	3000-4999 ft MSL Night	≥5000 ft MSL Day	≥5000 ft MSL Night	Total
A-10	4811	189	5000	45	90	275	10%	0%	30%	0%	20%	5%	10%	5%	15%	5%	100%
HC-130	183	317	500	45	50	200	0%		45%		40%		5%			10%	100%
HH-60	201	399	600	90	60	115	85%		10%		0%		5%			0%	100%
Transient*	300	100	400	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
*Transient includes:																	
(but not limited to)																	
F-18	43	15	58	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
F-16	43	14	57	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
F-15	43	14	57	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
SH-60	43	14	57	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
AH-1	43	14	57	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
UH-1	43	14	57	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
AV-8	43	14	57	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
T-38	0	0	0	30	85	480	10%		30%		20%	5%	10%	5%	15%	5%	100%
TOTAL			6500														

Reviewed 12 Nov 2010 by Airspace Manager

**BASELINE AND PROPOSED
TOWNSEND RANGE ORDNANCE USE
(EXCEL WORKBOOK)**

Townsend Range

Weekly operating days: 5
Annual operating days: 250

Ordnance Use

	Baseline		Proposed	
	Annual	Daily	Annual	Daily
BDU-33	8,600	34.40	10,600	42.40
BDU-50/MK-82	641	2.56	691	2.76
MK-83	93	0.37	93	0.37
BDU-56/MK-84	76	0.30	76	0.30
20-mm	25,000	100	25,000	100
30-mm	83,500	334	283,500	1,134
2.75-in Rockets	388	1.55	1,388	5.55
Total	118,298	473.19	321,348	1285.39

Day/Night Split

from Moody Airspace Operations Data Spreadsheet

Day 79%
Night 21%

Townsend Range Daily Ordnance Use

	Baseline		Total	Proposed		Total
	Day	Night		Day	Night	
BDU-33	27.18	7.22	34.40	33.50	8.90	42.40
BDU-50/MK-82	2.03	0.54	2.56	2.18	0.58	2.76
MK-83	0.29	0.08	0.37	0.29	0.08	0.37
BDU-56/MK-84	0.24	0.06	0.30	0.24	0.06	0.30
20-mm	79.00	21.00	100.00	79.00	21.00	100.00
30-mm	263.86	70.14	334.00	895.86	238.14	1,134.00
2.75-in Rockets	1.23	0.33	1.55	4.39	1.17	5.55
Total	373.82	99.37	473.19	1,015.46	269.93	1,285.39

APPENDIX B

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

Appendix B

Applicable Laws, Regulations, Policies, and Planning Criteria

When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. In addition to the National Environmental Policy Act (NEPA), there are other environmental laws and Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

NOTE: This is not a complete list of all applicable laws, regulations, policies, and planning criteria potentially applicable to documents, however, it does provide a general summary for use as a reference.

Airspace Management

Airspace management procedures assist in preventing potential conflicts or accidents associated with aircraft using designated airspace in the United States, including restricted military airspace. Airspace management involves the coordination, integration, and regulation of the use of airspace. The Federal Aviation Administration (FAA) has overall responsibility for managing airspace through a system of flight rules and regulations, airspace management actions, and air traffic control (ATC) procedures. All military and civilian aircraft are subject to Federal Aviation Regulations (FARs). The FAA's *Aeronautical Information Manual* defines the operational requirements for each of the various types or classes of military and civilian airspace.

Some military services have specific guidance for airspace management. For example, airspace management in the U.S. Air Force (USAF) is guided by Air Force Instruction (AFI) 13-201, *Air Force Airspace Management*. This AFI provides guidance and procedures for developing and processing special use airspace (SUA). It covers aeronautical matters governing the efficient planning, acquisition, use, and management of airspace required to support USAF flight operations. It applies to activities that have operational or administrative responsibility for using airspace, establishes practices to decrease disturbances from flight operations that might cause adverse public reaction, and provides flying unit commanders with general guidance for dealing with local problems.

Noise

Federal, state, and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978, requires compliance with state and local noise laws and ordinances.

The U.S. Department of Housing and Urban Development (HUD), in coordination with the Department of Defense (DOD) and the FAA, has established criteria for acceptable noise levels for aircraft operations relative to various types of land use.

The USAF's Air Installation Compatible Use Zone (AICUZ) Program, (AFI 32-7063), provides guidance to air bases and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near USAF installations.

Land Use

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activities occurring on a defined parcel of land. In many cases, land use descriptions are codified in local zoning laws. However, there is no nationally recognized convention or uniform terminology for describing land use categories.

Land use planning in the USAF is guided by Air Force Pamphlet 32-1010, *Land Use Planning* (November 1, 1998). The pamphlet focuses on the installation’s need to organize, adopt and implement processes, concepts, and land use alternatives prescribed in AFI 32-7062, *Comprehensive Planning*. It also supports implementation of Air Force Policy Directive 32-10, *Air Force Installations and Facilities*.

Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation’s air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQS) which regulate carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to utilize financial and technical assistance and leadership from the Federal government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by the USEPA as being in attainment or nonattainment for pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCRs). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassified. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction and long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency could also be subject to USEPA’s Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states all Federal agencies will comply with all Federal- and state-approved requirements.

The General Conformity Rule requires that any Federal action meet the requirements of a State Implementation Plan (SIP) or Federal Implementation Plan. More specifically, CAA conformity is ensured when a Federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS.

The General Conformity Rule applies only to actions in nonattainment or maintenance areas and considers both direct and indirect emissions. The rule applies only to Federal actions that are considered “regionally significant” or where the total emissions from the action meet or exceed the *de minimis* thresholds presented in 40 Code of Federal Regulations (CFR) 93.153. An action is regionally significant when the total nonattainment pollutant emissions exceed 10 percent of the AQCR’s total emissions inventory for that nonattainment pollutant. If a Federal action does not meet or exceed the *de minimis*

thresholds and is not considered regionally significant, then a full Conformity Determination is not required.

On May 13, 2010, the USEPA issued the Greenhouse Gas (GHG) Tailoring Rule that sets thresholds for GHG emissions from large stationary sources. The new GHG emissions thresholds for large stationary sources define when permits under the New Source Review Prevention of PSD and Title V Operating Permit programs are required for new and existing industrial facilities. Beginning January 2, 2011, large industrial facilities that have CAA permits for non-GHG emissions must also include GHGs in these permits. Beginning July 1, 2011, all new construction or renovations that increase GHG emissions by 75,000 tons of carbon dioxide or equivalent per year or more will be required to obtain construction permits for GHG emissions. Operating permits will be needed by all sources that emit GHGs above 75,000 tons of carbon dioxide or equivalent per year beginning in July 2011.

Health and Safety

Human health and safety relates to workers' health and safety during demolition or construction of facilities, or applies to work conditions during operations of a facility that could expose workers to conditions that pose a health or safety risk. The Federal Occupational Safety and Health Administration (OSHA) issues standards to protect persons from such risks, and the DOD and state and local jurisdictions issue guidance to comply with these OSHA standards. Safety also can refer to safe operations of aircraft or other equipment.

AFI 91-202, *USAF Mishap Prevention Program*, implements AFD 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 23, 1997), directs Federal agencies to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Federal agencies must also ensure that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks.

Geology and Soil Resources

Recognizing that millions of acres per year of prime farmland are lost to development, Congress passed the Farmland Protection Policy Act (FPPA) to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland (7 CFR Part 658). Prime farmland is described as soils that have a combination of soil and landscape properties that make them highly suitable for cropland, such as high inherent fertility, good water-holding capacity, and deep or thick effective rooting zones, and that are not subject to periodic flooding. Under the FPPA, agencies are encouraged to conserve prime or unique farmlands when alternatives are practicable. Some activities that are not subject to the FPPA include Federal permitting and licensing, projects on land already in urban development or used for water storage, construction for national defense purposes, or construction of new minor secondary structures such as a garage or storage shed.

Water Resources

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specified contaminants

in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

The USEPA issued a Final Rule for the CWA concerning technology-based Effluent Limitations Guidelines and New Source Performance Standards for the Construction and Development point source category. All NPDES storm water permits issued by the USEPA or states must incorporate requirements established in the Final Rule. As of February 1, 2010, all new construction sites are required to meet the non-numeric effluent limitations and design, install, and maintain effective erosion and sedimentation controls. In addition, construction site owners and operators that disturb 1 or more acres of land are required to use best management practices (BMPs) to ensure that soil disturbed during construction activities does not pollute nearby water bodies. Effective August 1, 2011, construction activities disturbing 20 or more acres must comply with the numeric effluent limitation for turbidity in addition to the non-numeric effluent limitations. The maximum daily turbidity limitation is 280 nephelometric turbidity units (ntu). On February 2, 2014, construction site owners and operators that disturb 10 or more acres of land are required to monitor discharges to ensure compliance with effluent limitations as specified by the permitting authority. Construction site owners are encouraged to phase ground-disturbing activities to limit the applicability of the monitoring requirements and the turbidity limitation. The USEPA's limitations are based on its assessment of what specific technologies can reliably achieve. Permittees can select management practices or technologies that are best suited for site-specific conditions.

The Coastal Zone Management Act (CZMA) of 1972 declares a national policy to preserve, protect, and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone refers to the coastal waters and the adjacent shorelines, including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and includes the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone through the development of land and water use programs in cooperation with Federal and local governments. States may apply for grants to help develop and implement management programs to achieve wise use of the land and water resources of the coastal zone. Under Section 307, Federal agency activities that affect any land or water use or natural resource of a coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the state's coastal management program.

The Safe Drinking Water Act (SDWA) of 1974 establishes a Federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new Federal enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set current Federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

The Wild and Scenic Rivers Act of 1968 provides for a wild and scenic river system by recognizing the remarkable values of specific rivers of the Nation. These selected rivers and their immediate environment are preserved in a free-flowing condition, without dams or other construction. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by an Act of Congress, an act of state legislature, or by the Secretary of the Interior upon the recommendation of the governor of the state(s) through which the river flows.

EO 11988, *Floodplain Management* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted floodproofing and flood protection to include elevating structures above the base flood level rather than filling in land.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (October 5, 2009), directed the USEPA to issue guidance on Section 438 of the Energy Independence and Security Act (EISA). The EISA establishes into law new storm water design requirements for Federal construction projects that disturb a footprint of greater than 5,000 square feet of land. Under these requirements, predevelopment site hydrology must be maintained or restored to the maximum extent technically feasible with respect to temperature, rate, volume, and duration of flow. Predevelopment hydrology would be calculated and site design would incorporate storm water retention and reuse technologies to the maximum extent technically feasible. Post-construction analyses will be conducted to evaluate the effectiveness of the as-built storm water reduction features. These regulations are applicable to DOD Unified Facilities Criteria. Additional guidance is provided in the USEPA's *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*.

EO 13514 also requires Federal agencies to improve water efficiency and management by reducing potable water consumption intensity by 2 percent annually, or by 26 percent, by Fiscal Year (FY) 2020, relative to a FY 2007 baseline. Furthermore, Federal agencies must also reduce agency industrial, landscaping, and agricultural water consumption by 2 percent annually, or 20 percent, by FY 2020, relative to a FY 2010 baseline.

EO 13547, *Stewardship of the Ocean, Our Coasts, and the Great Lakes* (July 19, 2010), establishes a national policy to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources; enhance the sustainability of ocean and coastal economies; preserve our maritime heritage; support sustainable uses and access; provide for adaptive management to enhance our understanding of and capacity to respond to climate change and ocean acidification; and coordinate with our national security and foreign policy interests.

Biological Resources

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species which can be obtained by calling the appropriate State Fish and Wildlife office. Some species also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess; offer to or sell, barter, purchase, or deliver; or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport, or carry from one state, territory, or district to another; or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

Incidental take of migratory birds during DOD military readiness activities is addressed by the final rule, "Migratory Bird Permits; Take of Migratory Birds by the Armed Forces," issued by the U.S. Department of the Interior, USFWS in the Federal Register (Vol. 72, No. 39) on February 28, 2007 (50 CFR Part 21). Section 315 of the 2003 National Defense Authorization Act (Authorization Act) provides that the Secretary of the Interior shall exercise his or her authority under Section 704(a) of the MBTA to prescribe regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense or the Secretary of the military department concerned. The Authorization Act further requires the Secretary of the Interior to promulgate such regulations with the concurrence of the Secretary of Defense. The Secretary has delegated this task to the USFWS. In passing the Authorization Act, Congress itself determined that allowing incidental take of migratory birds as a result of military readiness activities is consistent with the MBTA. With this language, Congress clearly expressed its intention that the Armed Forces give appropriate consideration to the protection of migratory birds when planning and executing military readiness activities, but not at the expense of diminishing the effectiveness of such activities. As directed by Section 315 of the Authorization Act, the final rule for take of migratory birds by the Armed Forces authorizes such incidental takes, with limitations, that result from military readiness activities of the Armed Forces. If any of the Armed Forces determine that a proposed or an ongoing military readiness activity could result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects. The Secretary of the Interior will retain the power to withdraw or suspend the authorization for particular activities in appropriate circumstances.

The Sikes Act (16 U.S.C. 670a-670o, 74 Stat. 1052), as amended, Public Law (P.L.) 86-797, approved September 15, 1960, provides for cooperation by the Departments of the Interior and Defense with state

agencies in planning, development, and maintenance of fish and wildlife resources on military reservations throughout the United States. In November 1997, the Sikes Act was amended via the Sikes Act Improvement Amendment (P.L. 105-85, Division B, Title XXIX) to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate this program, the amendments require the Secretaries of the military departments to prepare and implement Integrated Natural Resources Management Plans (INRMPs) for each military installation in the United States unless the absence of significant natural resources on a particular installation makes preparation of a plan for the installation inappropriate. INRMPs must be reviewed by the USFWS and applicable states every 5 years. The National Defense Authorization Act of 2004 modified Section 4(a) (3) of the ESA to preclude the designation of critical habitat on DOD lands that are subject to an INRMP, if the Secretary of the Interior determines in writing that such a plan provides a benefit to the species for which critical habitat is proposed for designation.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

Cultural Resources

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the religious use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and American Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). The ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the NHPA directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 106 of the act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 establishes rights of American Indian tribes to claim ownership of certain “cultural items,” defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on Federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate American Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971), directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which might qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American Indian religious practitioners’ access to and ceremonial use of American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000), was issued to provide for regular and meaningful consultation and collaboration with Native American tribal officials in the development of Federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Native American tribes. EO 13175 recognizes the following fundamental principles: Native American tribes exercise inherent sovereignty over their lands and members, the United States government has a unique trust relationship with Native American tribes and deals with them on a government-to-government basis, and Native American tribes have the right to self-government and self-determination.

EO 13287, *Preserve America* (March 3, 2003), orders Federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

Socioeconomics and Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations, and develop agencywide environmental justice strategies. The strategy must list “programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations.” A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each Federal agency.

Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal “Superfund” to respond to emergencies immediately. Although the “Superfund” provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters. Section 120(h) of CERCLA requires Federal agencies to notify prospective buyers of contaminated Federal properties about the type, quantity, and location of hazardous substances that would be present.

The Pollution Prevention Act (PPA) of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes; redesigning products; substituting raw materials; and making improvements in management techniques, training, and inventory control. Consistent with pollution prevention principles, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (January 24, 2007 [revoking EO 13148]), sets a goal for all Federal agencies to promote environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and use of paper of at least 30 percent post-consumer fiber content. In addition, EO 13423 sets a goal that requires Federal agencies to ensure

that they reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of; increase diversion of solid waste, as appropriate; and maintain cost-effective waste prevention and recycling programs at their facilities. Additionally, in *Federal Register* Volume 58 Number 18 (January 29, 1993), CEQ provides guidance to Federal agencies on how to “incorporate pollution prevention principles, techniques, and mechanisms into their planning and decisionmaking processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA.”

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for “cradle-to-grave” management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive, toxic, or listed by USEPA as being hazardous. With the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA strengthens control of both hazardous and nonhazardous waste and emphasizes the prevention of pollution of groundwater.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards and authorizes USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the Emergency Planning and Community Right to Know Act (EPCRA), which requires facility operators with “hazardous substances” or “extremely hazardous substances” to prepare comprehensive emergency plans and to report accidental releases. If a Federal agency acquires a contaminated site, it can be held liable for cleanup as the property owner/operator. A Federal agency can also incur liability if it leases a property, as the courts have found lessees liable as “owners.” However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it can claim the “innocent purchaser” defense under CERCLA. According to Title 42 United States Code (U.S.C.) 9601(35), the current owner/operator must show it undertook “all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice” before buying the property to use this defense.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorized USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singled out polychlorinated biphenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and could cause adverse health effects in humans. TSCA and its regulations govern the manufacture, processing, distribution, use, marking, storage, disposal, clean-up, and release reporting requirements for numerous chemicals like PCBs. TSCA Title II provides statutory framework for “Asbestos Hazard Emergency Response,” which applies only to schools. TSCA Title III, “Indoor Radon Abatement,” states indoor air in buildings of the United States should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, “Lead Exposure Reduction,” directs Federal agencies to “conduct a comprehensive program to promote safe, effective, and affordable monitoring, detection, and abatement of lead-based paint and other lead exposure hazards.” Further, any Federal agency having jurisdiction over a property or facility must comply with all Federal, state, interstate, and local requirements concerning lead-based paint.

Energy

The Energy Policy Act (EPAcT) of 2005, P.L. 109-58, amended portions of the National Energy Conservation Policy Act and established energy management goals for Federal facilities and fleets. Section 109 of EPAcT directs that new Federal buildings (commercial or residential) be designed 30 percent below American Society of Heating, Refrigerating, and Air-Conditioning Engineers standards or the International Energy Code. Section 109 also includes the application of sustainable design principles for new buildings and requires Federal agencies to identify new buildings in their budget requests that meet or exceed the standards. Section 203 of EPAcT requires that all Federal agencies' renewable electricity consumption meet or exceed 3 percent from FY 2007 through FY 2009, with increases to at least 5 percent in FY 2010 through FY 2012 and 7.5 percent in FY 2013 and thereafter. Section 203 also establishes a double credit bonus for Federal agencies if renewable electricity is produced onsite at a Federal facility, on Federal lands, or on Native American lands. Section 204 of EPAcT establishes a photovoltaic energy commercialization program for Federal buildings.

EO 13514, *Federal Leadership In Environmental, Energy, And Economic Performance* (dated October 5, 2009), directs Federal agencies to improve water use efficiency and management; implement high performance sustainable Federal building design, construction, operation and management; and advance regional and local integrated planning by identifying and analyzing impacts from energy usage and alternative energy sources. EO 13514 also directs Federal agencies to prepare and implement a Strategic Sustainability Performance Plan to manage its greenhouse gas emissions, water use, pollution prevention, regional development and transportation planning, sustainable building design and promote sustainability in its acquisition of goods and services. Section 2(g) requires new construction, major renovation, or repair and alteration of buildings to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings. The CEQ regulations at 40 CFR 1502.16(e) directs agencies to consider the energy requirements and conservation potential of various alternatives and mitigation measures.

Section 503(b) of EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, instructs Federal agencies to conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically, and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. EO 13423 sets goals in energy efficiency, acquisition, renewable energy, toxic chemical reduction, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation. Sustainable design measures such as the use of "green" technology (e.g., photovoltaic panels, solar collection, heat recovery systems, wind turbines, green roofs, and habitat-oriented storm water management) would be incorporated where practicable.

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APPENDIX C

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

Appendix C

IICEP Distribution List

Federal

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Mr. Chris Bauman
Regional Supervisor
Georgia Department of Natural Resources
1773-A Bowen's Mill Highway
Fitzgerald, GA 31750

Mr. Strant Colwell
Assistant Field Supervisor
Brunswick Field Office, USFWS
4270 Norwich Street
Brunswick, GA 31520

Ms. Barbara Jackson
SPOC, Georgia State Clearinghouse
270 Washington Street Southwest
8th Floor
Atlanta, GA 30334

Ms. Serena Bellew
State Historic Preservation Officer
47 Trinity Ave Southwest
Suite 414-H
Atlanta, GA 30334

Mr. George Constantino
Refuge Manager
Okefenokee National Wildlife Refuge
Route 2, Box 3330
Folkston, GA 31537

Supervisor's Office
Ocala National Forest
325 John Knox Road
Suite F-100
Tallahassee, FL 32303

Wayne Hrydziusko
Planning Manager
Florida Department of Environment
3900 Commonwealth Boulevard, M.S. 535
Tallahassee, FL 32399-3000

Lauren Milligan
SPOC, Florida State Clearinghouse
3900 Commonwealth Boulevard, M.S. 47
Tallahassee, FL 32399-3000

Local

Mr. John J. Fretti
Mayor, City of Valdosta
316 East Central Avenue
Valdosta, GA 31601

Mr. Albert Studstill
Lanier County Board of Commissioners
100 Main Street County Courthouse
Lakeland, GA 31635

Mr. Rodney Casey
Chairman, Lowndes County Board of
Commissioners
325 West Savannah Avenue
Valdosta, GA 31601

Sherriff Nick Norton
Lanier County Sherriff's Office
100 Main Street County Courthouse
Lakeland, GA 31635

Tribal

Alabama-Quassarte Tribal Town
Creek Nations of Indians, Oklahoma
P.O. Box 187
Wetumka, OK 74883

The Cherokee Nation
Chadwick Smith, Principal Chief
Dr. Richard L. Allen, THPO
Post Office Box 948
Tahlequah, OL 74465-0948

United Keetoowah Band of Cherokee Indians
Dallas Proctor, Chief
Post Office Box 746
Tahlequah, OK 74465-0746

Stephen "Archie" Mouse
Assistant Chief and THPO
2450 South Muskogee
Tahlequah, OK 74464

Muscogee (Creek) Nation
A.D. Ellis, Principal Chief
Joyce Bear, THPO
Tim Thompson, ASST THPO
Highway 75 & Loop 56
Post Office Box 580
Okmulgee, OK 74447-0580

Poarch Creek Indians
Eddie Tullis, Chairman
Gale Thrower, Cultural Archives Director
5811 Jack Springs Rd
Atmore, AL 36502

Poarch Band of Creek Indians
5811 Jack Springs Road
Atmore, AL 36502

Thlopthlocco Tribal Town
Charles Coleman
Warrior, Historic Preservation
Officer, and NAGPRA
Representative
Thlopthlocco Tribal Town
Route 1
Weleetka, OK 74880

Seminole Nation of Oklahoma
Kenneth Chambers, Principal Chief
Emman Spain, THPO
Post Office Box 1498
Wewoka, OK 74884

Seminole Tribe of Florida
Willard S. Steele, THPO
Ah-Tah-Thi-Ki Museum
HC-61, Box 21-A
Clewiston, FL 33440

Kialegee Tribal Town
P.O. Box 332
Wetumka, OK 74883

Coushatta Tribe of Louisiana
Sickey, Chairman
P.O. Box 818
Elton, LA 70532

Alabama Coushatta Tribe of Texas
Kevin Battise, Chairman
571 State Park Road 56
Livingston, TX 77351

Muscogee Nation of Florida
850-835-2078
850-835-5691
PO Box 3028
Bruce, FL 3245



DEPARTMENT OF THE AIR FORCE
23RD CIVIL ENGINEER SQUADRON (ACC)
MOODY AIR FORCE BASE GEORGIA

APR 17 2009

MEMORANDUM FOR: Muscogee Nation of Florida
P.O. Box 3028
Bruce, FL 3245


FROM: 23 CES/CC
3485 Georgia Street
Moody AFB GA 31699-1707

SUBJECT: Proposed Expansion of Sortie-Operations at Moody Air Force Base, Georgia

1. Moody Air Force Base (AFB) proposes to expand sortie-operations within existing airspace components and ranges and implement a corresponding weapons expenditure rate increase on existing ranges to ensure required mission readiness training for Moody AFB Airmen (Attachment). This training would increase the number of aircraft sortie-operations in seven Military Operations Areas (MOAs), two military training routes, a low-altitude tactical navigation area, and two bombing ranges (Grand Bay Range and Townsend Range) that are currently used by Moody AFB Airmen. Two additional existing MOAs and one additional existing range (Pinecastle Range) are also proposed for use. This action proposes to increase sortie-operations by Moody AFB Airmen by approximately 84%.

2. An environmental assessment is being prepared for this project in accordance with the National Environmental Policy Act, and will consider potential impacts on airspace management, noise, land use, air quality, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, infrastructure, and safety (including public safety, range and airspace safety, and the generation, use, and disposal of hazardous wastes and materials). Please forward any identified issues or concerns to our project manager, Ms. Johnna Thackston, at the above address by 15 May 2009.

3. If you have any specific questions relative to the proposal, please contact Ms. Thackston at (229) 257-2396 or by e-mail at johnna.thackston@moody.af.mil.


GREG A. WILLIAMS, Lt Col, USAF
Commander

Attachment

Figure 1 – Assessed Airspace Components and Bombing Ranges Used by Moody AFB Aircraft

Global Power for America

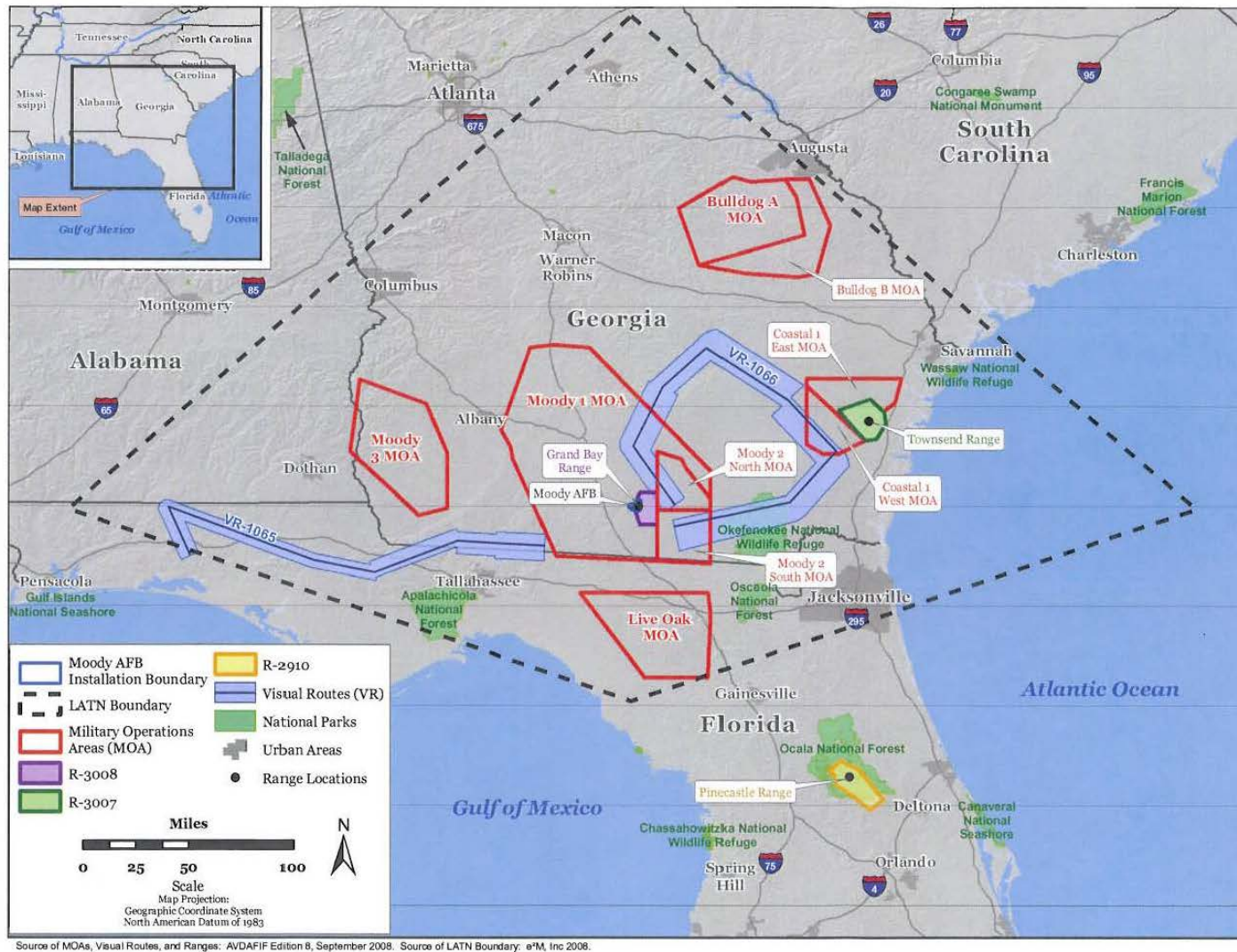


Figure 1 – Assessed Airspace Components and Bombing Ranges Used by Moody AFB Aircraft



HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

March 27, 2012

John L. Eunice, III, DAF
Deputy Base Civil Engineer
Department of the Air Force
23D Civil Engineer Squadron (ACC)
Moody Air Force Base, Georgia
Attn: Gregory Lee (gregory.lee@moody.af.mil)

**RE: Moody Air Force Base: Expand Sortie-Operations & Weapons Expenditure Increase
Lowndes County, Georgia
HP-090428-006**

Dear Mr. Eunice:

The Historic Preservation Division (HPD) has received the information submitted concerning the above referenced undertaking. Our comments are offered to assist the US Department of the Air Force and Moody Air Force Base in complying with provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

The subject project consists of the increase in operations within established airspace and increase in ordnance use at Townsend Range, Georgia. Based on the submitted information, HPD concurs that the proposed project will have **no effect** on archaeological resources or historic structures that are listed in or eligible for listing in the National Register of Historic Places (NRHP), as defined in 36 CFR Part 800.4(d)(1). Please note that historic and/or archaeological resources may be located within the project's area of potential effect (APE), however, at this time it has been determined that they will not be impacted by the above-referenced project. Furthermore, any changes to this project as proposed will require further review by our office for compliance with Section 106.

Please refer to project number **HP-090428-006** in any future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact Erin Parr, Environmental Review Specialist, at (404) 651-6546.

Sincerely,

Elizabeth Shirk
Environmental Review Coordinator

ES:ebp

cc: Michael Jacobs, Southern Georgia Regional Commission

Georgia Department of Natural Resources

Historic Preservation Division

Chris Clark, Commissioner

W. Ray Luce, Division Director and Deputy State Historic Preservation Officer
34 Peachtree Street, NW, Suite 1600, Atlanta, Georgia 30303-2316
Telephone (404) 656-2840 Fax (404) 657-1040 <http://www.qashpo.org>

May 19, 2009

Greg Williams,
Lieutenant Colonel, USAF
Commander
Department of the Air Force
Attention: Johnna Thackston
23 CES/CC
3485 Georgia Street
Moody Air Force Base, Georgia 31699-1707

**RE: Moody AFB: Expand Sortie-Operations and Weapons Expenditure Increase
Lowndes County, Georgia
HP-090428-006**

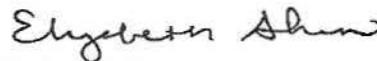
Dear Lieutenant Colonel Williams:

The Historic Preservation Division (HPD) has received initial information submitted concerning the above referenced project. Our comments are offered to assist US Department of the Air Force (USAF) and its applicants in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Thank you for notifying us of this proposed project. Your notice dated April 17, 2009, will serve as initiation of the Section 106 review process. We look forward to receiving Section 106 compliance materials from you when they become available.

Please refer to project number **HP-090428-006** in future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6624, or Michelle Volkema, Environmental Review Specialist, at (404) 651-6546.

Sincerely,



Elizabeth Shirk
Environmental Review Coordinator

ES:mav

cc: Julia Swechuck, South Georgia RDC




OFFICE OF PLANNING AND BUDGET

Sonny Perdue
Governor

Trey Childress
Director

GEORGIA STATE CLEARINGHOUSE MEMORANDUM EXECUTIVE ORDER 12372 REVIEW PROCESS

TO: Johnna Thackston
Dept. of the Air Force
23 CES/CC
3485 Georgia Street
Moody AFB, GA 31699-1707

FROM: Barbara Jackson 
Georgia State Clearinghouse

DATE: May 1, 2009

SUBJECT: Proposed Expansion of Sortie-Operations at Moody AFB, GA

I received your correspondence concerning the above on April 28, 2009. Georgia State Clearinghouse itself does not have the knowledge or expertise to provide input concerning environmental issues. Our primary function will be to coordinate intergovernmental review processing of this project once the EA is ready.

Although I will forward on the material included, I must inform you that some of the state's reviewing agencies may opt not to provide *preliminary* comments on proposed projects, instead, waiting to review the EA itself through Clearinghouse's intergovernmental review process.

Once ready, for this particular project, we ask that you submit eight (8) copies along with 1 brief cover letter/memo. If this is a large document, the copies can be submitted on cds; however, we request at least one be a hard (paper) copy.

/bj



ALABAMA-COUSHATTA TRIBE OF TEXAS

571 State Park Rd 56 • Livingston, Texas 77351 • (936) 563-1100

June 2, 2009

Johnna Thackston
Moody Air Force Base
23 CES/CC
3485 Georgia Street
Moody AFB, GA 31699-1707

Dear Ms. Thackston:

On behalf of Chief Oscola Clayton Sylestine and the Alabama-Coushatta Tribe, our appreciation is expressed on your agency's efforts to consult us regarding the proposed expansion of Sortie-Operations at Moody Air Force Base.

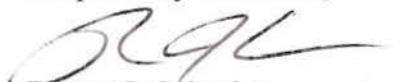
Our Tribe maintains ancestral associations within the state of Georgia despite the absence of written records to completely identify Tribal activities, villages, trails, or grave sites. However, it is our objective to ensure significances of Native American ancestry, especially of the Alabama-Coushatta Tribe, are administered with the utmost attention.

Upon review of the April 17, 2009 information summary submitted to our Tribe, a determination of immediate impacts to religious, cultural, or historical assets of the Alabama-Coushatta Tribe of Texas could not be ascertained. The proposed locations of 3 MOA and Live Oak MOA include migratory routes and temporary habitation sites utilized by ancestral members of the Alabama and Coushatta Tribes.

Therefore, we maintain a concern for impacts to cultural resources within this region. In the event of inadvertent discovery of human remains and/or archaeological artifacts, activity in proximity to the location must cease and appropriate authorities, including this office, notified without delay.

Should you require additional assistance, please do not hesitate to contact us.

Respectfully submitted,


Bryant J. Celestine
Historic Preservation Officer

Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1154, Atlanta, Georgia 30334

Chris Clark, Commissioner

Environmental Protection Division

Carol A. Couch, Ph.D., Director

404/656-2833

May 22, 2009

Ms. Johnna Thackston
Department of the Air Force
23 CES/CC
3485 Georgia Street
Moody AFB, GA 31699-1707

RE: Solicitation of Preliminary Comments on the *Environmental Assessments for:*

- *Proposed Implementation of Intentional Management of Wetlands*
- *Proposed Expansion of Sortie Operations*

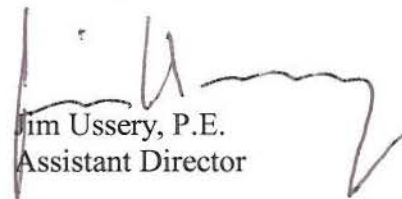
Moody Air Force Base, Georgia

Dear Ms. Thackston:

Thank you for the opportunity to provide preliminary comments on the above-referenced forthcoming Environmental Assessments (EAs). We have no comments at this time. We look forward to reviewing and commenting on the more detailed EAs.

Should you have any questions concerning this correspondence, please contact Amy Potter at (404) 656-2833.

Sincerely,



Jim Ussery, P.E.
Assistant Director

File: Moody AFB (R)

S:\RDRIVE\AMY\DoD Unit\NEPA\Moody\No preliminary comments on wetlands EA.doc

From the desk of...

4/29/09

John J. Fretti
Mayor

Mrs. Thochister,

*Thank you for the letter
from Greg A. Williams Lt. COL USAF
regarding increased sortie ops
at Moody AFB Ga.*

I have no objections.





United States Department of the Interior Fish and Wildlife Service



Okefenokee National Wildlife Refuge
Banks Lake National Wildlife Refuge
2700 Suwannee Canal Road
Folkston, Georgia 31537
(912) 496-7366

May 11, 2009

Ms. Johnna Thackston
Department of the Air Force
23d Civil Engineer Squadron (ACC)
Moody Air Force Base, Georgia 31699-1707

Subject: Issues and Concerns over the Proposed Expansion of Sortie-Operations at Moody Air Force Base, Georgia

Dear Ms. Thackston:

Thank you for the opportunity to voice our issues and concerns on the proposed increase of Sortie-Operations that will impact the mission of the U.S. Fish and Wildlife Service at both the Banks Lake and Okefenokee National Wildlife Refuges.

Okefenokee National Wildlife Refuge

We ask that the environmental assessment address the potential impacts of the proposed action on the degradation of the wilderness character and wildlands-wilderness experience Okefenokee Refuge provides currently to the American public. We request the opportunity to work with your office to both quantify when and how often there will be more air operations over the Okefenokee Refuge and then develop reasonable operational guidelines for military over flights that will assure that the impact to our mission will be as insignificant as possible.

To help you understand our concerns for the impact of Moody Air Operations over the Okefenokee National Wildlife Refuge, we offer the following information. The refuge has over 353,000 acres of Congressionally Designated Wilderness Area within its boundaries. The Okefenokee Wilderness is the third largest designated Wilderness Area east of the Mississippi River. Over 400,000 visitors come to the refuge each year. A significant number are repeat visitors that have come to know, respect, and now expect a quality of wilderness experiences with every visit they make. Refuge staff, volunteers, contractors, concessionaires, and even researchers incorporate wilderness ideals of solitude and natural system functions into every work day.

The eco-tourism that the refuge experiences have become the core of an "Economic Engine" that helps to power the economies of five rural counties. The report, titled *Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation* estimated that for Calendar Year 2005, domestic travelers to the Okefenokee added a total of \$74.60 million dollars to just three of the local counties of Charlton, Ware and Clinch County, Georgia.

Ms. Thackston

Page 2

May 11, 2009

Ware and Clinch counties alone, where most of the increased sorties are proposed, account for about \$62 million in added revenue from eco-tourism.

A large portion of our visitors are day-use visitors who boat, fish, photograph, observe wildlife and attend environmental education activities and interpretive programs. They are accustomed to some of the intrusions imposed by the “crush” of other visitors but can and do seek relief by finding out-of-the-way locations on the refuge where others rarely or only occasionally visit. Multi-day and night wilderness visitors are fewer in number but their passion for wilderness can not be under estimated. They are insistent that the quality of their visits to a National Wilderness Area not be degraded by outside, unnatural circumstances. For instance, they are accustomed to not having cell phone coverage and often comment about how quiet and serene the refuge areas continue to be. Visual jet streams are obtrusive in a wilderness area along with light and noise pollution. Visitors are intrigued with and truly embrace the ideal of not hearing car horns, automobile traffic, heavy equipment, televisions, radios, etc.

The Stephen C. Foster State Park near Fargo, Georgia accumulates about one third of our annual visitation (130,000 visitors) during a normal year. Since the majority of their visitors stay over night in their Commercial Campground or in Rental Cabins for multiple nights, this group plus Overnight Wilderness Campers within the western portion of the refuge will be severely impacted by any increased air sorties within their visible and auditory airspace. The park staff has reported a small but increasing number of low level air operations by Moody aircraft over the park headquarters and campgrounds during the last year. In each case, the impact of the air operations over the park was a notable disturbance to the wildland – wilderness recreational experience of park visitors.

The Georgia State Parks is also in the process of expanding their facilities in the Fargo, Georgia area by establishing a Suwannee River Visitor Center and Eco-Lodge Complex just south of the refuge. Total visitation figures for this complex are not yet available but the City of Fargo is highly motivated to expand the use of these facilities.

An additional issue is the 1,500+ colonial wading birds that nest in the northwest quadrant of the refuge underneath the path of the proposed increase in air operations. This colony has increased in size over the past several years. We are concerned that the proposed increase in sorties will impact the nesting success for these and other species. Please contact Refuge Wildlife Biologist Sara Aicher at 912-496-7366 x236 for more information.

Banks Lake

Banks Lake National Wildlife Refuge (NWR) near Lakeland Georgia has dealt with air flights and combat mission training on the adjacent bombing range since its designation as a National Wildlife Refuge in 1985. Banks Lake is currently a very popular local and regional fishery

Ms. Thackston

Page 3

May 11, 2009

resource for Southeast Georgia. The recent addition of a contracted commercial concession facility which supplies bait, tackle, canoe and kayak rentals has spurred some increased interest in fishing as well as wildlife observation and photography.

Again, we are concerned for the impacts of the proposed action on refuge visitors and the on site commercial concession operations. We have a strong concern with the proposal to increase sorties on weekends when the majority of our visiting public are utilizing refuge waters. Although annual visitation to the refuge is currently only 20,000 plus visitors per year, the housing boom resulting from the rapid development of Moody Air Force Base and nearby Valdosta and Lowndes County certainly promises to increase visitation significantly very soon.

We thank you for allowing us to identify our issues and concerns early on in the environmental assessment process. If there are any questions or any way that we can help with this project in the future, please do not hesitate to call on us.

Sincerely,



George M. Constantino
Refuge Manager

APPENDIX D
PUBLIC INVOLVEMENT



United States Department of the Interior

Fish and Wildlife Service

105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

May 8, 2012

Mr. John L Eunice, III
Department of the Air Force
23rd Civil Engineer Squadron
3485 Georgia Street
Moody Air Force Base, Georgia 31699
Attention: Gregory Lee

Re: USFWS 2012-0546

Dear Mr. Eunice:

Thank you for your letter initiating informal section 7 consultation for the proposed expansion of military aircraft sortie-operations at Moody Air Force Base (MAFB) in Lowndes County, Georgia. We submit the following comments in accordance with provisions of the Endangered Species Act of 1973, as amended; (16 U.S.C. 1531 *et seq.*) (ESA), the Bald and Golden Eagle Protection Act of 1940 (BGEPA), and the Migratory Bird Treaty Act of 1918 (MBTA) to further the conservation of fish and wildlife resources and their habitat, including federally listed threatened and endangered species.

The project proposes to expand military aircraft sortie-operations from MAFB and ordnance expenditures at Townsend Bombing Range. No land-disturbing activities or construction will be part of this action. Seven federally listed species were identified as potentially affected by the proposed action. These species are: wood stork (*Mycteria americana*), red-cockaded woodpecker (*Picoides borealis*), piping plover (*Charadrius melodus*), Indiana bat (*Myotis sodalists*), gray bat (*Myotis grisecens*), Eastern indigo snake (*Drymarchon couperi*), and frosted flatwoods salamander (*Ambystoma cingulatum*). Additionally, the bald eagle (*Haliaeetus leucocephalus*), is protected under the BGEPA and MBTA.

Based on the information provided in the February 2012 draft Environmental Analysis document for the proposed action, we concur with your determination that the proposed action is "not likely to adversely affect" federally protected species.

We appreciate the opportunity to comment during the planning stages of your project. If you have any additional questions, please write or call Chris Coppola of my staff at 912-832-8739.

Sincerely,

A handwritten signature in blue ink, appearing to read "Sandra S. Tucker".

Sandra S. Tucker
Field Supervisor

Handwritten initials in blue ink, possibly "CC" or "Coppola".

cc: USFWS, Athens, Georgia



CENTRAL SAVANNAH RIVER AREA REGIONAL COMMISSION

3023 River Watch Parkway, Suite A
Augusta, GA 30907-2016
(706) 210-2000 • FAX (706) 210-2006
www.csrarc.ga.gov



Answers.Action.Advocacy



Counties Served:

DATE: May 8, 2012

Burke

TO: Department of the Air Force

Columbia

FROM: Martin Laws, Regional Planner

SUBJECT: Executive Order 12372 Review

Glascock

Applicant: Department of the Air Force
Project: Environmental Assessment Addressing the
Expansion of Sortie-Operations
State Clearinghouse ID #: GA120413006
CSRA RC Staff Contact: Martin Laws
Federal Funds Requested: 0
Federal Agency: Department of Air Force

Hancock

Jefferson

Jenkins

The CSRA Regional Commission has reviewed the Summary Notification for the above-referenced project.

Lincoln

The RC has recommended approval of the project. You should now file your formal application with the appropriate federal agency. A copy of this form must be attached to your formal application.

McDuffie

Comments:

Richmond

Comments were solicited during this review. No comments were received.

Taliaferro

Copy to State Clearinghouse

Warren

Washington

Wilkes



For information on the Area Agency on Aging (AAA), a division of the CSRA Regional Commission, call (706) 210-2018 or toll free (and TDD) 1-888-922-4464. The AAA is your "Gateway to Community Resources" for seniors and individuals with disabilities. The CSRA Regional Commission is an Equal Opportunity Employer and Provider.



OFFICE OF PLANNING AND BUDGET

Nathan Deal
Governor

Debbie Dlugolenski Alford
Director

GEORGIA STATE CLEARINGHOUSE MEMORANDUM EXECUTIVE ORDER 12372 REVIEW PROCESS

TO: Rebecca Lopez
Dept. of the Air Force
23 CES/CD

FROM: Barbara Jackson *BB*
Georgia State Clearinghouse

DATE: 5/11/2012

APPLICANT: Dept. of the Air Force - Moody Air Force Base, GA

PROJECT: Draft EA/FONSI Addressing the Expansion of Sortie-Operations at Moody Air Force Base, GA

STATE ID: GA120413006

The applicant/sponsor indicated that they coordinated directly with DNR's Environmental Protection Division and DNR's Historic Preservation Division, two of our state reviewers for this type project.

The applicant/sponsor is advised to note additional comments from Coastal RC of Georgia.

The applicant/sponsor is advised that DNR's Wildlife Resources Division was included in this review but did not comment within the review period. Should they submit comments within the next two weeks, we will forward to you.

Provided that there is continued coordination on this project and any future issues and/or concerns are addressed satisfactorily, the State level review of the above-referenced proposal has been completed, and the proposal found to be consistent with those state or regional goals, policies, plans, fiscal resources, criteria for Developments of Regional Impact (DRI), environmental impacts, federal executive orders, acts and/or rules and regulations with which the state is concerned.

/bj

Enc.: Southern Georgia RC, May 3, 2012
Coastal RC of Georgia, May 4, 2012
CSRA RC, May 11, 2012
GA DOT, Apr. 25, 2012

GEORGIA STATE CLEARINGHOUSE MEMORANDUM
EXECUTIVE ORDER 12372 REVIEW PROCESS

TO: Barbara Jackson
Georgia State Clearinghouse
270 Washington Street, SW, 8th Floor
Atlanta, Georgia 30334

FROM: MS. JANICE MCKINNON
SOUTHERN GEORGIA RC

APPLICANT: Dept. of the Air Force - Moody Air Force Base, GA

PROJECT: Draft EA/FONSI Addressing the Expansion of Sortie-Operations at Moody Air
Force Base, GA

STATE ID: GA120413006

FEDERAL ID:

DATE:

☒ This project is considered to be consistent with those state or regional goals, policies, plans, fiscal resources, criteria for developments of regional impact, environmental impacts, federal executive orders, acts and/or rules and regulations with which this organization is concerned.

This project is not consistent with:

☐ The goals, plans, policies, or fiscal resources with which this organization is concerned. (Line through inappropriate word(s) and prepare a statement that explains the rationale for the inconsistency. (Additional pages may be used for outlining the inconsistencies. Be sure to put the GA State ID no. and any Federal ID no. on all pages.)

☐ The criteria for developments of regional impact, federal executive orders, acts and/or rules and regulations administered by your agency. Negative environmental impacts or provision for protection of the environment should be pointed out. (Additional pages may be used for outlining the inconsistencies. Be sure to put the GA State ID no. and any Federal ID no. on all pages.)

☐ This project does not impact upon the activities of the organization.

NOTE: Should you decide to FAX
this form (and any attached pages),
it is not necessary to mail the
originals to us. [770-344-3568]

Form SC-3
Mar. 2012

RECEIVED
MAY 03 2012
GEORGIA
STATE CLEARINGHOUSE

D 00 Remote ID: R page 01 of

**GEORGIA STATE CLEARINGHOUSE MEMORANDUM
EXECUTIVE ORDER 12372 REVIEW PROCESS**

TO: Barbara Jackson
Georgia State Clearinghouse
270 Washington Street, SW, Eighth Floor
Atlanta, Georgia 30334

FROM: MR. DAVID DANTZLER
COASTAL RC OF GEORGIA

APPLICANT: Dept. of the Air Force – Moody Air Force Base, GA

PROJECT: Draft EA/FONSI addressing the Expansion of Sortie-Operations at Moody Air Force Base, GA

STATE ID: GA120413006

FEDERAL ID:

DATE: May 5, 2012

☒ This notice is considered to be consistent with those state or regional goals, policies, plans, fiscal resources, criteria for developments of regional impact, environmental impacts, federal executive orders, acts and/or rules and regulations with which this organization is concerned.

Please see attached analysis and comments (1 page).

This notice is not consistent with:

- ☐ The goals, plans, policies, or fiscal resources with which this organization is concerned.
(Line through inappropriate word or words and prepare a statement that explains the rationale for the inconsistency. (Additional pages may be used for outlining the inconsistencies. Be sure to put the GA State ID number on all pages).
- ☐ The criteria for developments of regional impact, federal executive orders, acts and/or rules and regulations administered by this agency. Negative environmental impacts or provision for protection of the environment should be pointed out. (Additional pages may be used for outlining the inconsistencies). Be sure to put the GA State ID number on all pages).
- ☐ This notice does not impact upon the activities of the organization.

**NOTE: Should you decide to FAX
this form (and any attached pages),
it is not necessary to mail the
originals to us. [770-344-3568]**

Form SC-3
Aug. 2010

RECEIVED

MAY 04 2012

GEORGIA
STATE CLEARINGHOUSE

D 00 Remote ID: R page 02 of

GA120413006 Dept. of the Air Force – Moody Air Force Base, GA CRC Analysis and Comments

Coastal Regional Commission Clearinghouse Review of the Regional Plan for Coastal Georgia

Adopted June 9, 2010

Dept. of the Air Force – Moody Air Force Base, GA

Draft EA/FONSI addressing the Expansion of Sortie-Operations at Moody Air Force Base, GA

Review By David Dantzler, May 4, 2012 (Faxed)

Project: The USAF proposes the expansion of sortie-operations within existing airspace components and ranges and a corresponding weapons expenditure rate increase on existing ranges to ensure the accomplishment of readiness training requirements for Moody AFB aircraft and airmen. This will include increased operations at Townsend Range and Coastal 1 East and Coastal 1 West Military Operations Areas (MOAs).

Regional Plan Compliance:

Future Development Pattern – Military Installations

ARSA – Military Installations

QCO – N/A

Regional Plan Issues and Opportunities:

- NR-1** Loss of environmentally sensitive and ecologically valuable resources.
- NR-3** Development within wetlands and floodplains impacts drainage patterns and property values.
- O-NR-6** Advance green space preservation through protection of wetlands and floodplains.

Regional Plan Implementation: Stormwater Guiding Principles

- 1. Encourage development practices and sitings that do not significantly impact wetlands and habitat areas or allow for the preservation and conservation of wetlands and habitat areas through appropriate land use practices.

Natural Resources Guiding Principles

- 1. Promote the protection, restoration, enhancement and management of natural resources.
- 3. Protect and enhance Coastal Georgia's water resources, including surface water, groundwater, and wetlands and ground water recharge areas.
- 5. Commit to investing in the protection of natural resources before any restoration and/or remediation is needed.
- 6. Encourage the restoration and protection of wetlands to provide flooding, storm and habitat protection.

Performance Standard = 1 point

- 1. Develop a comprehensive assessment and resource management plan which includes an inventory of significant natural resources and viewsheds. This inventory should assess resource significance, with Regionally Important Resources ranked as most significant.

Regional Growth Guiding Principles

- 3. Protect our military installations from land use changes that jeopardize their mission through creation or implementation of Joint Land Use Studies (JLUS).

Comments:

The US Military is a regional leader as an example of sustainable development through the protection and management of natural and cultural/historic resources while maintaining and expanding its vital mission. The natural, historic and cultural impacts are minimal. The Regional Plan supports continued missions of the military installations located within the Region.

Source: The Regional Plan of Coastal Georgia; Adopted June 9, 2010;
http://www.crc.ga.gov/planning/docs/Final_Agenda_Adopted_060910.pdf

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STATE CLEARINGHOUSE



HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

March 27, 2012

John L. Eunice, III, DAF
Deputy Base Civil Engineer
Department of the Air Force
23D Civil Engineer Squadron (ACC)
Moody Air Force Base, Georgia
Attn: Gregory Lee (gregory.lee@moody.af.mil)

**RE: Moody Air Force Base: Expand Sortie-Operations & Weapons Expenditure Increase
Lowndes County, Georgia
HP-090428-006**

Dear Mr. Eunice:

The Historic Preservation Division (HPD) has received the information submitted concerning the above referenced undertaking. Our comments are offered to assist the US Department of the Air Force and Moody Air Force Base in complying with provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

The subject project consists of the increase in operations within established airspace and increase in ordnance use at Townsend Range, Georgia. Based on the submitted information, HPD concurs that the proposed project will have **no effect** on archaeological resources or historic structures that are listed in or eligible for listing in the National Register of Historic Places (NRHP), as defined in 36 CFR Part 800.4(d)(1). Please note that historic and/or archaeological resources may be located within the project's area of potential effect (APE), however, at this time it has been determined that they will not be impacted by the above-referenced project. Furthermore, any changes to this project as proposed will require further review by our office for compliance with Section 106.

Please refer to project number **HP-090428-006** in any future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact Erin Parr, Environmental Review Specialist, at (404) 651-6546.

Sincerely,

Elizabeth Shirk
Environmental Review Coordinator

ES:ebp

cc: Michael Jacobs, Southern Georgia Regional Commission

APPENDIX E

UNDERLYING COUNTIES BY AIRSPACE AND RANGE

Table E-1. Military Operations Areas and Affected Counties

MOA Name	County	State	MOA Name	County	State
Bulldog A MOA	Glascokk	Georgia	Moody 1 MOA (continued)	Turner	Georgia
	Jefferson			Ben Hill	
	Burke			Coffee	
	Washington			Irwin	
	Jenkins			Dougherty	
	Emanuel			Tift	
	Johnson			Berrien	
	Laurens			Ware	
Bulldog B MOA	Glascokk	Georgia		Mitchell	
	Jefferson			Atkinson	
	Burke			Cook	
	Washington			Colquitt	
	Jenkins			Lanier	
	Emanuel			Clinch	
	Johnson			Thomas	
	Laurens			Brooks	
Bulloch	Lowndes				
Candler	Echols				
Coastal 1 East MOA	Tattnall			Georgia	Jefferson
	Bryan		Madison		
	Liberty	Hamilton			
	Long	Columbia			
	Wayne	Atkinson	Georgia		
	McIntosh	Lanier			
	Glynn	Clinch			
Coastal 1 West MOA	Tattnall	Georgia	Moody 2 South MOA	Lanier	Georgia
	Wayne			Clinch	
	Glynn			Lowndes	
	Brantley			Echols	
Live Oak MOA	Madison	Florida		Hamilton	Florida
	Hamilton		Columbia		
	Columbia		Georgia		
	Suwannee				
	Taylor				
	Lafayette				
	Gilchrist				
Dixie					
Moody 1 MOA	Dooly	Georgia	Moody 3 MOA	Quitman	Georgia
	Sumter			Randolph	
	Wilcox			Clay	
	Crisp			Calhoun	
	Lee			Early	
	Worth			Baker	
	Mitchell	Alabama			
	Miller				
	Decatur				
	Seminole				
	Henry				
	Houston				

Table E-2. Ranges and Affected Counties

Range Name	County	State
Grand Bay Range	Lanier	Georgia
	Lowndes	
	Echols	
	Lake	
Townsend Range	Long	Georgia
	Wayne	
	McIntosh	
	Glynn	

Table E-3. LATN Area and Affected Counties

County	State	County	State	County	State
Lee	Alabama	St. Johns	Florida	Washington	Georgia
Macon		Clay		Meriwether	
Russell		Union		Troup	
Bullock		Bradford		Lamar	
Barbour		Alachua		Monroe	
Pike		Gilchrist		Pike	
Crenshaw		Dixie		Baldwin	
Henry		Franklin	Georgia	Jones	
Conecuh		Hart		Screven	
Coffee		Jackson		Wilkinson	
Dale		Elbert		Upton	
Covington		Madison		Bibb	
Houston		Barrow		Jenkins	
Escambia		Clarke		Twiggs	
Geneva		Oglethorpe		Talbot	
Jackson	Florida	Wilkes		Harris	
Holmes		Lincoln		Crawford	
Walton		Oconee		Emanuel	
Washington		Walton		Johnson	
Nassau		Morgan		Taylor	
Gadsden		Rockdale		Laurens	
Leon		Greene		Peach	
Jefferson		Newton		Houston	
Madison		Taliaferro		Bulloch	
Hamilton		Columbia		Muscogee	
Calhoun		McDuffie		Effingham	
Liberty		Henry		Bleckley	
Columbia		Warren		Marion	
Baker		Richmond		Candler	
Duval		Jasper		Chattahoochee	
Bay		Putnam		Macon	
Suwannee		Hancock		Treutlen	
Okaloosa		Butts		Dodge	
Santa Rosa		Spalding		Schley	
Taylor		Glascock		Pulaski	
Wakulla		Jefferson		Montgomery	
Lafayette		Burke		Toombs	

County	State
Tattnall	Georgia
Wheeler	
Dooly	
Evans	
Bryan	
Stewart	
Webster	
Sumter	
Telfair	
Wilcox	
Liberty	
Crisp	
Long	
Quitman	
Jeff Davis	
Appling	
Terrell	
Randolph	
Lee	
Chatham	
Worth	
Turner	
Ben Hill	
Wayne	
Coffee	
Clay	
Irwin	
Bacon	
McIntosh	
Dougherty	
Calhoun	
Tift	
Pierce	
Early	
Berrien	
Ware	
Glynn	
Baker	

County	State
Mitchell	Georgia
Atkinson	
Brantley	
Cook	
Colquitt	
Miller	
Lanier	
Clinch	
Camden	
Decatur	
Seminole	
Grady	
Thomas	
Brooks	
Charlton	
Lowndes	
Echols	
Allendale	South Carolina
Hampton	
Jasper	
Beaufort	

APPENDIX F

POTENTIAL THREATENED, ENDANGERED, AND SENSITIVE SPECIES IN THE ROI

Protected and Sensitive Wildlife Species Potentially Occurring under Affected Airspace

Common Name (Scientific Name)	Federal and State Status	Moody MOA				Live Oak MOA	Bulldog		Townsend Range (R-3007)	Coastal 1 MOA		Grand Bay Range (R-3008)
		1	2 N	2 S	3		A	B		East	West	
Fish												
Blackbanded sunfish (<i>Enneacanthus chaetodon</i>)	Fed: - GA: E FL: - AL: -								X			
Bluefin killifish (<i>Lucania goodei</i>)	Fed: - GA: R FL: - AL: -								X			
Amphibians												
Frosted flatwoods salamander (<i>Ambystoma cingulatum</i>)	Fed: T GA: T FL: SSC AL: -	X	X	X	X		X	X	X	X		X
Georgia blind salamander (<i>Haideotriton wallacei</i>)	Fed: - GA: T FL: SSC AL: -	X			X							
Red Hills salamander (<i>Phaeognathus hubrichti</i>)	Fed: T GA: - FL: - AL: SP											
Gopher frog (<i>Rana capito</i>)	Fed: - GA: R FL: SSC AL: SP					X			X	X		
Striped newt (<i>Notophthalmus perstriatus</i>)	Fed: - GA: T FL: - AL: -								X	X		X

Common Name (Scientific Name)	Federal and State Status	Moody MOA				Live Oak MOA	Bulldog		Townsend Range (R-3007)	Coastal 1 MOA		Grand Bay Range (R-3008)
		1	2 N	2 S	3		A	B		East	West	
Reptiles												
Alligator snapping turtle (<i>Macroclemys temminckii</i>)	Fed: - GA: T FL: SSC AL: SP	X	X	X	X	X						X
American alligator (<i>Alligator mississippiensis</i>)	Fed: T (S/A) GA: - FL: SSC AL: -	X	X	X		X			X	X		X
Barbour’s map turtle (<i>Graptemys barbouri</i>)	Fed: - GA: T FL: SSC AL: SP	X			X							
Eastern indigo snake (<i>Drymarchon corais couperi</i>)	Fed: T GA: T FL: T AL: SP	X	X	X	X	X	X	X		X	X	X
Florida pine snake (<i>Pituophis melanoleucus mugitis</i>)	Fed: - GA: - FL: SSC AL: SP					X						
Gopher tortoise (<i>Gopherus polyphemus</i>)	Fed: - GA: T FL: SSC AL: SP	X	X	X	X	X	X	X		X	X	X
Mimic glass lizard (<i>Ophisaurus mimicus</i>)	Fed: - GA: R FL: - AL: SP								X	X	X	
Short-tailed snake (<i>Stilosoma extenuatum</i>)	Fed: - GA: - FL: T AL: -	X		X		X						

Common Name (Scientific Name)	Federal and State Status	Moody MOA				Live Oak MOA	Bulldog		Townsend Range (R-3007)	Coastal 1 MOA		Grand Bay Range (R-3008)
		1	2 N	2 S	3		A	B		East	West	
Reptiles (continued)												
Southern hognose snake (<i>Heterodon simus</i>)	Fed: - GA: T FL: - AL: SP					X				X		
Spotted turtle (<i>Clemmys guttata</i>)	Fed: - GA: U FL: - AL: -					X			X	X		X
Birds												
American oystercatcher (<i>Haematopus palliates</i>)	Fed: - GA: R FL: SSC AL: SP								X	X	X	
Bachman’s sparrow (<i>Aimophila aestivalis</i>)	Fed: - GA: R FL: E AL: SP				X				X	X	X	X
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Fed: D GA: T FL: T AL: -	X	X	X	X	X	X	X	X	X	X	X
Black skimmer (<i>Rynchops niger</i>)	Fed: - GA: R FL: SSC AL: SP										X	
Florida sandhill crane (<i>Grus canadensis pratensis</i>)	Fed: - GA: - FL: T AL: -	X		X		X						

Common Name (Scientific Name)	Federal and State Status	Moody MOA				Live Oak MOA	Bulldog		Townsend Range (R-3007)	Coastal 1 MOA		Grand Bay Range (R-3008)
		1	2 N	2 S	3		A	B		East	West	
Birds (continued)												
Gull-billed tern (<i>Gelochelidon nilotica</i>)	Fed: - GA: T FL: - AL: SP								X	X	X	
Henslow’s sparrow (<i>Ammodramus henslowii</i>)	Fed: - GA: R FL: - AL: SP								X		X	
Least tern (<i>Sterna antillarum</i>)	Fed: - GA: R FL: T AL: SP	X				X			X	X	X	
Peregrine falcon (<i>Falco peregrinus</i>)	Fed: - GA: R FL: E AL: SP	X	X	X		X			X	X	X	X
Piping plover (<i>Charadrius melodus</i>)	Fed: T GA: T FL: T AL: SP	X				X			X	X	X	
Red-cockaded woodpecker (<i>Picoides borealis</i>)	Fed: E GA: E FL: SSC AL: SP	X	X	X	X	X	X	X	X	X	X	
Southeastern American kestrel (<i>Falco sparverius paulus</i>)	Fed: - GA: R FL: T AL: SP	X		X		X			X	X		

Common Name (Scientific Name)	Federal and State Status	Moody MOA				Live Oak MOA	Bulldog		Townsend Range (R-3007)	Coastal 1 MOA		Grand Bay Range (R-3008)
		1	2 N	2 S	3		A	B		East	West	
Birds (continued)												
Southeastern snowy plover (<i>Charadrius alexandrinus tenuirostris</i>)	Fed: - GA: - FL: T AL: SP											
Swallow-tailed kite (<i>Elanoides forficatus</i>)	Fed: - GA: R FL: - AL: SP					X			X	X	X	
Wilson’s plover (<i>Charadrius wilsonia</i>)	Fed: - GA: T FL: - AL: SP								X	X	X	
Wood stork (<i>Mycteria americana</i>)	Fed: E GA: E FL: E AL: SP	X	X	X	X	X	X	X	X	X	X	X
Mammals												
Florida black bear (<i>Ursus americanus floridanus</i>)	Fed: - GA: - FL: T AL: -	X		X		X						
Florida mouse (<i>Podomys floridanus</i>)	Fed: - GA: - FL: SSC AL: -					X						
Gray bat (myotis) (<i>Myotis grisescens</i>)	Fed: E GA: E FL: E AL: SP	X		X	X	X						

Common Name (Scientific Name)	Federal and State Status	Moody MOA				Live Oak MOA	Bulldog		Townsend Range (R-3007)	Coastal 1 MOA		Grand Bay Range (R-3008)
		1	2 N	2 S	3		A	B		East	West	
Mammals (continued)												
Indiana bat (<i>Myotis sodalis</i>)	Fed: E GA: E FL: E AL: SP											
Long-tailed weasel (<i>Mustela frenata</i>)	Fed: - GA: - FL: - AL: SP											
Rafinesque's big-eared bat (<i>Corynorhinus rafinesquii</i>)	Fed: - GA: R FL: - AL: SP								X	X		
Round-tailed muskrat (<i>Neofiber alleni</i>)	Fed: - GA: T FL: - AL: -	X				X						X
Sherman's fox squirrel (<i>Sciurus niger shermani</i>)	Fed: - GA: - FL: SSC AL: -					X						

Sources: USFWS 2012, GDNR 2011, FWC 2004, ANHP 2011, Moody AFB 2006, FNAI 2001

Key:

Fed = Federal
GA = Georgia
FL = Florida
AL = Alabama

T = Threatened
E = Endangered
R = Rare (Georgia)

U = Unusual (Georgia)
SSC = Species of Special Concern (Florida)
SP = State Protected (Alabama)

APPENDIX G

AIR QUALITY CALCULATIONS

Note: The aircraft operational modes used for modeling air quality are distinguished by fuel flow rates, engine thrust setting, and other factors. The four main aircraft operation modes are taxi/idle, approach, intermediate/climb out, and takeoff/military. According to the USAF IERA, approach mode is measured from the moment an aircraft enters the air quality mixing layer (3,000 feet AGL) until the time when the aircraft lands. This analysis did not estimate air quality emissions above the mixing layer or on the ground (idle/initial takeoff and landings). Therefore approach mode best fits the expected load, and was used in this analysis so that the highest potential

Total Proposed Action Air Quality Emissions for Baseline and Proposed Scenarios

Airspace	Baseline Emissions (tpy)					Proposed Emissions (tpy)				
	NO _x	VOC	CO	SO _x	PM ₁₀	NO _x	VOC	CO	SO _x	PM ₁₀
Moody 1 MOA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Moody 2 North MOA	13.053	2.378	32.150	1.025	9.779	13.185	2.433	32.415	1.045	10.114
Moody 2 South MOA	5.746	0.514	3.839	0.352	1.725	13.240	2.645	39.951	1.108	10.224
Moody 3 MOA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Live Oak MOA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bulldog A MOA	2.927	0.431	3.468	0.146	1.194	3.220	0.540	5.332	0.179	1.644
Bulldog B MOA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Coastal 1 East MOA	36.978	3.544	10.064	1.574	14.138	37.266	3.651	11.902	1.607	14.581
Coastal 1 West MOA	36.978	3.544	10.064	1.574	14.138	37.266	3.651	11.902	1.607	14.581
Grandy Bay Range	10.103	2.617	42.204	0.951	10.659	15.557	3.486	54.125	1.384	14.026
Townsend Range	80.179	7.627	20.544	3.398	30.412	80.467	7.734	22.382	3.431	30.856
LATN Area	28.193	5.651	84.815	2.356	22.893	28.978	5.712	85.316	2.405	23.108
Total	214.158	26.307	207.148	11.376	104.938	229.178	29.851	263.324	12.766	119.135

Delta Change in Air Quality Emissions for Baseline, and Proposed Scenarios

Alternative	NO _x	VOC	CO	SO _x	PM ₁₀
Baseline	214.158	26.307	207.148	11.376	104.938
Delta Change	15.021	3.544	56.176	1.390	14.197

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would likely be the same, regardless of whether future year budget data set were used.

Georgia, Florida, Alabama, and South Carolina Counties Within Area Potentially Affected by Proposed Action

Point and Area Sources Combined					
Year	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO _x (tpy)	PM ₁₀ (tpy)
2002	598,430	772,994	4,077,089	430,829	678,996

Source: USEPA-AirData NET Tier Report (<http://www.epa.gov/air/data/geosel.html>). Website accessed 8 April 2009.

Determination Significance (Significance Threshold = 10%) for Proposed Flight Operations

Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO _x (tpy)	PM ₁₀ (tpy)
Minimum - 2002	598,430.33	772,994.41	4,077,088.92	430,828.98	678,995.58
Baseline Emissions	214.16	26.31	207.15	11.38	104.94
Baseline %	0.036%	0.003%	0.005%	0.003%	0.015%

Determination Significance (Significance Threshold = 10%) for Proposed Flight Operations

Point and Area Sources Combined					
	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO _x (tpy)	PM ₁₀ (tpy)
Minimum - 2002	598,430.33	772,994.41	4,077,088.92	430,828.98	678,995.58
Proposed Emissions	229.18	29.85	263.32	12.77	119.13
Proposed %	0.038%	0.004%	0.006%	0.003%	0.018%

Emissions summary by AQCR

AQCR	Regional Emissions						Baseline Emissions						Proposed Emissions					
	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	165,877	45,971	35,610	11,990	38,852	38,223	0.024	0.008	0.006	0.000	0.001	0.002	0.024	0.008	0.006	0.000	0.001	0.002
Augusta-Aiken Interstate AQCR	341,186	60,948	73,939	17,911	38,155	65,808	8.210	3.865	2.381	0.000	0.260	0.675	9.438	4.107	2.684	0.000	0.285	0.749
Central Georgia Intrastate AQCR	300,706	98,877	79,147	23,516	173,118	53,702	13.939	5.272	3.855	0.000	0.405	1.001	14.684	5.495	4.049	0.000	0.424	1.049
Columbus-Phenix City Interstate AQCR	465,006	56,628	82,269	23,359	34,830	99,016	7.697	2.558	2.077	0.000	0.214	0.513	7.742	2.630	2.097	0.000	0.218	0.518
Jacksonville-Brunswick Interstate AQCR	1,719,049	251,228	187,030	77,806	133,672	338,068	93.350	167.537	70.901	0.000	7.950	17.846	113.029	170.490	75.973	0.000	8.293	18.959
Metropolitan Atlanta Intrastate AQCR	1,328,113	223,378	148,829	33,713	173,342	212,815	2.235	0.743	0.603	0.000	0.062	0.149	2.248	0.764	0.609	0.000	0.063	0.151
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	1,318,640	297,113	221,217	68,714	262,379	302,772	4.492	1.493	1.213	0.000	0.125	0.299	4.519	1.535	1.224	0.000	0.127	0.303
Northeast Georgia Intrastate AQCR	399,359	51,031	96,347	17,677	10,879	66,514	3.293	1.095	0.889	0.000	0.091	0.219	3.312	1.125	0.897	0.000	0.093	0.222
Savannah-Beaufort Interstate AQCR	411,006	69,532	62,370	22,725	60,110	67,552	8.560	11.971	5.409	0.000	0.589	1.350	9.094	12.103	5.545	0.000	0.601	1.383
Southeast Alabama Intrastate AQCR	8,206	790	2,639	601	177	1,723	6.149	2.044	1.660	0.000	0.171	0.410	6.185	2.101	1.675	0.000	0.174	0.414
Southwest Georgia Intrastate AQCR	454,996	44,920	109,199	34,458	24,059	94,882	60.767	19.031	16.172	0.000	1.619	4.023	93.052	28.823	24.375	0.000	2.485	6.103
Total	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	207.15	214.16	104.94	0.00	11.38	26.31	263.33	229.18	119.14	0.00	12.77	29.85

Aircraft Type	Moody 1 MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	3652	108	3760	90	275	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	8	0	8	50	200	0.8	0%	0%	100%	0.0%	45	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	100%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	5	4	9	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	5	4	9	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	5	4	9	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Moody 2 North MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	2004	0	2004	90	275	0.7	80%	20%	0%	100.0%	40	40	4.1516	1.5388	26.4895	0.4751	6.392586
C-130	270	186	456	45	150	1.0	0%	100%	0%	100.0%	60	60	6.3613	0.6664	3.7216	0.3981	3.332129
UH-60	201	211	412	60	115	1.5	90%	10%	0%	100.0%	90	90	2.3360	0.1143	1.6223	0.1421	0.015450
F-15	7	0	7	85	480	0.4	10%	70%	20%	80.0%	25	20	0.1122	0.0458	0.0172	0.0041	0.023546
F-16	7	0	7	85	480	0.4	10%	70%	20%	80.0%	25	20	0.0505	0.0010	0.0050	0.0017	0.009619
F-18	7	0	7	85	480	0.4	10%	70%	20%	80.0%	25	20	0.0330	0.0033	0.0268	0.0028	0.000303
AT-38	8	0	8	85	480	0.4	10%	70%	20%	80.0%	25	20	0.0082	0.0087	0.2675	0.0013	0.005112
TOTAL													13.0528	2.3783	32.1499	1.0252	9.7787

Aircraft Type	Moody 2 South MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700- 2200)	Night (2200- 0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
C-130	270	186	456	50	200	1.0	0%	50%	50%	50.0%	60	30	3.1807	0.3332	1.8608	0.1991	1.666064
UH-60	201	211	412	60	115	1.5	100%	0%	0%	100.0%	90	90	2.3360	0.1143	1.6223	0.1421	0.015450
F-15	7	0	7	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.1262	0.0516	0.0193	0.0046	0.026490
F-16	7	0	7	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.0569	0.0011	0.0057	0.0019	0.010822
F-18	7	0	7	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.0371	0.0037	0.0302	0.0031	0.000341
AT-38	8	0	8	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.0092	0.0098	0.3010	0.0015	0.005751
TOTAL													5.7461	0.5136	3.8392	0.3523	1.7249

Aircraft Type	Moody 3 MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700- 2200)	Night (2200- 0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	1946	16	1962	90	275	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	62	22	84	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	62	22	84	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-22	62	22	84	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	62	22	84	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	63	22	85	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Live Oak MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft AGL	Total Time (mins)	Total Time Below 3000 ft AGL	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	572	0	572	90	275	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	11	0	11	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	11	0	11	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	11	0	11	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	11	0	11	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Bulldog A MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	312	0	312	90	275	0.5	15%	85%	0%	100.0%	30	30	0.4848	0.1797	3.0931	0.0555	0.746440
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	205	2	207	85	480	0.5	0%	10%	90%	10.0%	30	3	0.4976	0.2033	0.0762	0.0183	0.104445
F-16	1643	17	1660	85	480	0.5	0%	10%	90%	10.0%	30	3	1.7980	0.0338	0.1795	0.0598	0.342170
F-18	206	2	208	85	480	0.5	0%	10%	90%	10.0%	30	3	0.1471	0.0146	0.1196	0.0124	0.001350
TOTAL													2.9275	0.4314	3.4684	0.1460	1.1944

Aircraft Type	Bulldog B MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Below	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	168	0	168	90	275	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	175	3	178	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	1406	22	1428	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	176	3	179	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Coastal 1 East MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Below	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	604	160	764	90	275	0.5	15%	0%	85%	15.0%	30	4.5	0.1781	0.0660	1.1361	0.0204	0.274173
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	0.8895	0.7413	4.5402	0.2464	0.009266
C-130	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	1.3604	0.1425	0.7959	0.0851	0.712608
C-17	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	27.7492	0.6389	2.6621	0.9796	11.755623
F-15	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	4.6885	1.9158	0.7184	0.1721	0.984105
F-16	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	2.1126	0.0397	0.2110	0.0703	0.402029
TOTAL													36.9783	3.5442	10.0636	1.5740	14.1378

Aircraft Type	Coastal 1 West MOA																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Below	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	604	160	764	90	275	0.5	15%	0%	85%	15.0%	30	4.5	0.1781	0.0660	1.1361	0.0204	0.274173
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	0.8895	0.7413	4.5402	0.2464	0.009266
C-130	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	1.3604	0.1425	0.7959	0.0851	0.712608
C-17	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	27.7492	0.6389	2.6621	0.9796	11.755623
F-15	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	4.6885	1.9158	0.7184	0.1721	0.984105
F-16	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	2.1126	0.0397	0.2110	0.0703	0.402029
TOTAL													36.9783	3.5442	10.0636	1.5740	14.1378

Aircraft Type	Grandy Bay Range (R-3008 A-D)																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Below	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	2852	112	2964	90	275	0.8	70%	20%	10%	90.0%	45	40.5	6.2171	2.3043	39.6688	0.7114	9.573089
C-130	84	145	229	50	200	0.8	45%	40%	15%	85.0%	45	38.25	2.0366	0.2134	1.1915	0.1275	1.066774
UH-60	113	224	337	60	115	1.5	95%	0%	5%	95.0%	90	85.5	1.8153	0.0888	1.2606	0.1105	0.012006
F-15	1	0	1	85	480	0.5	25%	50%	25%	75.0%	30	22.5	0.0180	0.0074	0.0028	0.0007	0.003784
F-16	1	0	1	85	480	0.5	25%	50%	25%	75.0%	30	22.5	0.0081	0.0002	0.0008	0.0003	0.001546
F-18	1	0	1	85	480	0.5	25%	50%	25%	75.0%	30	22.5	0.0053	0.0005	0.0043	0.0004	0.000049
AT-38	1	1	2	85	480	0.5	25%	50%	25%	75.0%	30	22.5	0.0023	0.0024	0.0752	0.0004	0.001438
TOTAL													10.1027	2.6170	42.2040	0.9511	10.6587

Aircraft Type	Townsend Range (R-3007 A-D)																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Below	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	604	160	764	90	275	0.5	15%	0%	85%	15.0%	30	4.5	0.1781	0.0660	1.1361	0.0204	0.274173
C-130	0	0	0	0	0	0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	1.9337	1.6114	9.8699	0.5356	0.020143
C-130	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	2.9575	0.3098	1.7302	0.1851	1.549148
C-17	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	60.3244	1.3889	5.7871	2.1296	25.555701
F-15	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	10.1925	4.1648	1.5618	0.3742	2.139358
F-16	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	4.5925	0.0864	0.4586	0.1529	0.873975
TOTAL													80.1786	7.6274	20.5437	3.3977	30.4125

Aircraft Type	LATN Area																
	Baseline Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Baseline Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Below	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	4700	300	5000	75	225	0.8	90%	10%	0%	100.0%	45	45	11.6530	4.3191	74.3529	1.3334	17.943263
C-130	524	51	575	50	210	1.2	75%	25%	0%	100.0%	70	70	9.3583	0.9804	5.4749	0.5857	4.901980
UH-60	1070	70	1140	60	100	1.7	90%	10%	0%	100.0%	100	100	7.1820	0.3515	4.9875	0.4370	0.047500
F-15	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	0	0	0	85	480	0.4	0%	0%	100%	0.0%	25	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-22	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	0	0	0	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-17	0	0	0	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
T-6	0	0	0	80	180	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-172	0	0	0	80	180	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AV-8	0	0	0	90	350	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													28.1933	5.6510	84.8154	2.3561	22.8927

Aircraft Type	Moody 1 MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	5000	1000	6000	90	275	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	0	0	0	50	200	0.8	0%	0%	100%	0.0%	45	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	100%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	40	10	50	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	20	5	25	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	10	5	15	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-22	10	2	12	80	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	8	2	10	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Moody 2 North MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700- 2200)	Night (2200- 0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	3500	500	4000	90	275	0.7	20%	30%	50%	50.0%	40	20	4.1433	1.5357	26.4366	0.4741	6.379827
C-130	296	204	500	45	150	1.0	0%	100%	0%	100.0%	60	60	6.9752	0.7307	4.0807	0.4365	3.653650
UH-60	293	307	600	70	115	0.5	20%	80%	0%	100.0%	30	30	1.1340	0.0555	0.7875	0.0690	0.007500
F-15	4	0	4	85	480	0.4	10%	70%	20%	80.0%	25	20	0.0641	0.0262	0.0098	0.0024	0.013455
F-16	31	0	31	85	480	0.4	10%	70%	20%	80.0%	25	20	0.2238	0.0042	0.0224	0.0075	0.042599
F-18	117	16	133	85	480	0.4	10%	70%	20%	80.0%	25	20	0.6271	0.0621	0.5097	0.0529	0.005753
AT-38	17	0	17	85	480	0.4	10%	70%	20%	80.0%	25	20	0.0174	0.0184	0.5685	0.0028	0.010864
TOTAL													13.1848	2.4329	32.4152	1.0452	10.1136

Aircraft Type	Moody 2 South MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
C-130	296	204	500	50	200	1.0	0%	50%	50%	50.0%	60	30	3.4876	0.3654	2.0404	0.2183	1.826825
A-10	3500	500	4000	90	275	0.7	40%	25%	35%	65.0%	40	26	5.3863	1.9964	34.3676	0.6163	8.293775
UH-60	293	307	600	60	115	1.5	100%	0%	0%	100.0%	90	90	3.4020	0.1665	2.3625	0.2070	0.022500
F-15	4	0	4	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.0721	0.0295	0.0111	0.0026	0.015137
F-16	31	0	31	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.2518	0.0047	0.0251	0.0084	0.047924
F-18	117	0	117	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.6206	0.0615	0.5044	0.0524	0.005693
AT-38	17	0	17	85	480	0.4	45%	45%	10%	90.0%	25	22.5	0.0195	0.0208	0.6395	0.0031	0.012221
TOTAL													13.2399	2.6447	39.9506	1.1082	10.2241

Aircraft Type	Moody 3 MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	1800	40	1840	90	275	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	173	62	235	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	161	58	219	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-22	48	17	65	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	31	11	42	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	8	3	11	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Live Oak MOA																	
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)											
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)					
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀	
A-10	1250	200	1450	90	275	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000	
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000	
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000	
F-15	24	0	24	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000	
F-16	20	0	20	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000	
F-18	10	0	10	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000	
AT-38	6	0	6	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000	
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000	

Aircraft Type	Bulldog A MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below 3000 ft	Total Time (mins)	Total Time Below 3000 ft	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	500	0	500	90	275	0.5	15%	85%	0%	100.0%	30	30	0.7769	0.2879	4.9569	0.0889	1.196218
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	205	2	207	85	480	0.5	0%	10%	90%	10.0%	30	3	0.4976	0.2033	0.0762	0.0183	0.104445
F-16	1643	17	1660	85	480	0.5	0%	10%	90%	10.0%	30	3	1.7980	0.0338	0.1795	0.0598	0.342170
F-18	206	2	208	85	480	0.5	0%	10%	90%	10.0%	30	3	0.1471	0.0146	0.1196	0.0124	0.001350
TOTAL													3.2196	0.5397	5.3322	0.1794	1.6442

Aircraft Type	Bulldog B MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	500	0	500	90	275	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-15	175	3	178	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	1406	22	1428	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	176	3	179	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													0.0000	0.0000	0.0000	0.0000	0.0000

Aircraft Type	Coastal 1 East MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	1581	419	2000	90	275	0.5	15%	0%	85%	15.0%	30	4.5	0.4661	0.1728	2.9741	0.0533	0.717731
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	0.8895	0.7413	4.5402	0.2464	0.009266
C-130	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	1.3604	0.1425	0.7959	0.0851	0.712608
C-17	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	27.7492	0.6389	2.6621	0.9796	11.755623
F-15	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	4.6885	1.9158	0.7184	0.1721	0.984105
F-16	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	2.1126	0.0397	0.2110	0.0703	0.402029
TOTAL													37.2664	3.6510	11.9016	1.6069	14.5814

Aircraft Type	Coastal 1 West MOA																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	1581	419	2000	90	275	0.5	15%	0%	85%	15.0%	30	4.5	0.4661	0.1728	2.9741	0.0533	0.717731
C-130	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0.0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	0.8895	0.7413	4.5402	0.2464	0.009266
C-130	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	1.3604	0.1425	0.7959	0.0851	0.712608
C-17	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	27.7492	0.6389	2.6621	0.9796	11.755623
F-15	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	4.6885	1.9158	0.7184	0.1721	0.984105
F-16	315	53	368	85	480	0.5	3%	50%	47%	53.0%	30	15.9	2.1126	0.0397	0.2110	0.0703	0.402029
TOTAL													37.2664	3.6510	11.9016	1.6069	14.5814

Aircraft Type	Grandy Bay Range (R-3008 A-D)																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700-2200)	Night (2200-0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	4811	189	5000	90	275	0.8	40%	25%	35%	65.0%	45	29.25	7.5744	2.8074	48.3294	0.8667	11.663121
C-130	183	317	500	50	200	0.8	45%	40%	15%	85.0%	45	38.25	4.4467	0.4658	2.6014	0.2783	2.329202
UH-60	201	399	600	60	115	1.5	95%	0%	5%	95.0%	90	85.5	3.2319	0.1582	2.2444	0.1967	0.021375
F-15	1	0	1	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0156	0.0064	0.0024	0.0006	0.003280
F-16	1	0	1	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0070	0.0001	0.0007	0.0002	0.001340
F-18	1	0	1	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0046	0.0005	0.0037	0.0004	0.000042
SH-60	43	14	57	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0346	0.0035	0.0675	0.0030	0.001354
AH-1W	43	14	57	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0691	0.0070	0.1349	0.0059	0.002709
UH-1N	43	14	57	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0141	0.0003	0.0021	0.0011	0.000365
AV-8	43	14	57	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.1566	0.0344	0.6732	0.0312	0.001566
AT-38	1	1	2	85	480	0.5	40%	25%	35%	65.0%	30	19.5	0.0020	0.0021	0.0652	0.0003	0.001246
TOTAL													15.5566	3.4857	54.1250	1.3844	14.0256

Aircraft Type	Townsend Range (R-3007 A-D)																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700- 2200)	Night (2200- 0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	1581	419	2000	90	275	0.5	15%	0%	85%	15.0%	30	4.5	0.4661	0.1728	2.9741	0.0533	0.717731
C-130	0	0	0	0	0	0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
UH-60	0	0	0	0	0	0	0%	0%	0%	0.0%	0	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	1.9337	1.6114	9.8699	0.5356	0.020143
C-130	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	2.9575	0.3098	1.7302	0.1851	1.549148
C-17	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	60.3244	1.3889	5.7871	2.1296	25.555701
F-15	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	10.1925	4.1648	1.5618	0.3742	2.139358
F-16	686	114	800	85	480	0.5	3%	50%	47%	53.0%	30	15.9	4.5925	0.0864	0.4586	0.1529	0.873975
TOTAL													80.4667	7.7341	22.3817	3.4307	30.8561

Aircraft Type	LATN Area																
	Proposed Annual Sorties			Flight Profile			Altitude Distribution (in Percent)										
	Day (0700- 2200)	Night (2200- 0700)	Total	Typical/ Average Power Setting	Indicated Airspeed (knots)	Time Spent in Airspace Per Sortie (Hours)	<1000 ft AGL	1000-3000 ft AGL	3000+ ft AGL	Minutes Below 3000 ft AGL			Proposed Emissions (tpy)				
C-130 Example	960	7	967	65	165	0.5	5%	5%	90%	% Time Below	Total Time (mins)	Total Time Be	NO _x	VOC	CO	SO _x	PM ₁₀
A-10	4700	300	5000	75	225	0.8	90%	10%	0%	100.0%	45	45	11.6530	4.3191	74.3529	1.3334	17.943263
C-130	547	53	600	50	210	1.2	75%	25%	0%	100.0%	70	70	9.7652	1.0230	5.7130	0.6112	5.115110
UH-60	1126	74	1200	70	115	1.7	90%	10%	0%	100.0%	100	100	7.5600	0.3700	5.2500	0.4600	0.050000
F-15	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-16	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-18	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AT-38	0	0	0	85	480	0.4	0%	0%	100%	0.0%	25	0	0.0000	0.0000	0.0000	0.0000	0.000000
F-22	0	0	0	85	480	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
B-707	0	0	0	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-17	0	0	0	85	480	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
T-6	0	0	0	80	180	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
C-172	0	0	0	80	180	0.7	0%	0%	100%	0.0%	40	0	0.0000	0.0000	0.0000	0.0000	0.000000
AV-8	0	0	0	90	350	0.5	0%	0%	100%	0.0%	30	0	0.0000	0.0000	0.0000	0.0000	0.000000
TOTAL													28.9782	5.7122	85.3159	2.4046	23.1084

Aircraft
A-10
Number of Engines:

Engine
TF34-GE-100
2

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
449	773	1,516	3,026

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
20.70	1.49	0.65	0.40	86.68	25.65	6.28	4.00	1.35	4.02	6.42	8.83	8.00	6.19	8.93	2.67	0.46	0.46	0.46	0.46

Aircraft
Alpha Jet
Number of Engines:

Engine
O-200
1

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0010	0.0032	0.0057	0.0057

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
29.000	33.200	20.800	20.800	644.000	1188.000	974.000	974.000	1.600	1.100	4.870	4.870	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
AT-38
Number of Engines:

Engine
J85-GE-5H
2

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
506	1,071	2,155	2,815

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
15.34	3.04	0.64	0.52	158.22	93.67	28.38	28.98	2.11	2.86	5.67	4.66	4.70	1.79	1.13	1.13	0.46	0.46	0.46	0.46

Aircraft
B-1
Number of Engines:

Engine
F101-GE-102
4

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,117	4,533	6,557	7,828

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
0.00	0.14	0.13	0.11	24.47	1.03	0.85	0.83	4.10	9.16	13.15	2.17	2.17	4.23	1.35	1.68	0.46	0.46	0.46	0.46

Aircraft
B-2
Number of Engines:

Engine
F118-GE-100
4

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,097	3,773	6,350	10,887

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
0.59	0.87	0.00	0.00	20.98	2.02	0.84	0.65	4.30	11.09	18.01	33.12	1.25	4.47	1.78	1.64	0.46	0.46	0.46	0.46

Aircraft
B-52
Number of Engines:

Engine
TF33-P-3/103
8

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
900	3,800	6,240	7,440

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
90.91	1.37	1.50	0.55	95.06	5.24	2.11	0.00	1.39	6.37	7.88	12.08	4.98	3.55	3.15	3.67	0.46	0.46	0.46	0.46

Aircraft
C-130
Number of Engines:

Engine
T56-A-9
4

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
725	949	1,724	2,068

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
2.25	0.77	0.51	0.35	5.62	4.30	2.44	2.51	7.47	7.35	9.39	11.19	3.64	3.85	1.46	1.22	0.46	0.46	0.46	0.46

Aircraft
C-17
Number of Engines:

Engine
F117-PW-100
4

Fuel Flow (lb/hr)			
T/O	C/O	App	Idle
13,976	10,919	4,279	1,104

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM10 Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
T/O	C/O	App	Idle	T/O	C/O	App	Idle	T/O	C/O	App	Idle	T/O	C/O	App	Idle	Idle	App	Int	Mil
0.03	0.21	0.30	2.15	0.40	0.36	1.25	23.86	34.30	30.02	13.03	3.96	2.31	2.31	5.52	10.54	0.46	0.46	0.46	0.46

Aircraft
C-172
Number of Engines:

Engine
TSIO-360C
1

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0015	0.0077	0.0125	0.0168

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
138.000	11.000	9.500	9.170	592.000	995.000	961.000	1080.000	269.000	451.000	491.000	4.870	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
CH-146
Number of Engines:

Engine
PT6T-3D
2

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0357	0.1533	0.2160	0.2371

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
27.970	0.195	0.060	0.285	75.460	4.970	1.850	2.970	1.615	5.490	7.450	8.010	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
CH-47
Number of Engines:

Engine
T55-L712
2

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0168	0.0630	0.0742	0.0890

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
56.670	0.370	0.490	0.390	53.180	5.250	3.750	3.090	2.780	7.560	8.180	8.610	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
F-15C/E
Number of Engines:

Engine
F100-PW-220
2

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,084	3,837	5,770	9,679

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
7.94	5.12	2.89	1.79	35.30	1.92	0.86	0.86	4.61	12.53	22.18	29.32	2.06	2.63	2.06	1.33	0.46	0.46	0.46	0.46

Aircraft
F-16
Number of Engines:

Engine
F100-PW-200
1

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,016	3,135	5,406	8,717

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
8.28	0.26	0.22	0.13	26.61	1.38	0.49	0.86	4.99	13.82	27.60	39.12	2.06	2.63	2.06	1.33	0.46	0.46	0.46	0.46

Aircraft
F-18
Number of Engines:

Engine
F404-GE-400
2

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0786	0.3270	0.7462	3.5780

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
58.180	0.540	0.350	0.130	137.340	4.430	1.210	23.120	1.160	5.450	12.750	9.220	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
F-22
Number of Engines:

Engine
F119-PW-100
2

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,084	3,837	5,770	9,679

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
7.94	5.12	2.89	1.79	35.30	1.92	0.86	0.86	4.61	12.53	22.18	29.32	2.06	2.63	2.06	1.33	0.46	0.46	0.46	0.46

Aircraft
F-35/JSF
Number of Engines:

Engine
F119-PW-100
2

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,084	3,837	5,770	9,679

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
7.94	5.12	2.89	1.79	35.30	1.92	0.86	0.86	4.61	12.53	22.18	29.32	2.06	2.63	2.06	1.33	0.46	0.46	0.46	0.46

Aircraft
F-5
Number of Engines:

Engine
J85-GE-5H
2

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0638	0.1349	0.2715	1.0250

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
15.340	3.040	0.640	2.290	158.340	93.670	28.380	14.190	2.110	2.860	5.670	2.090	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
KC-10
Number of Engines:

Engine
F103-GE-101
3

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,706	5,238	15,675	19,738

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
21.80	1.00	0.70	0.60	61.79	4.30	0.50	0.50	3.60	9.50	29.79	36.54	2.75	1.19	0.89	1.18	0.46	0.46	0.46	0.46

Aircraft
KC-135E
Number of Engines:

Engine
TF33-P-102
4

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
1,065	3,912	6,985	8,756

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
106.96	1.74	0.95	0.53	117.03	12.37	2.01	0.45	1.80	5.84	8.74	12.39	4.98	3.55	3.15	3.67	0.46	0.46	0.46	0.46

Aircraft
MH-47
Number of Engines:

Engine
T55-L712
2

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.0168	0.0630	0.0742	0.0890

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
56.670	0.370	0.490	0.390	53.180	5.250	3.750	3.090	2.780	7.560	8.180	8.610	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
SH-60
Number of Engines:

Engine
T700-GE-401C
2

Fuel Flow (lb/hr)			
Idle	App	Climbout	Takeoff
432	348	443	442

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff
0.54	0.54	0.53	0.53	10.46	10.46	10.11	10.15	5.36	5.36	5.60	5.59	0.12	0.21	0.46	0.53	0.46	0.46	0.46	0.46

Aircraft
T-1
Number of Engines:

Engine
JT15D-5B
2

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
221	496	1,359	1,630

VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil
79.60	8.43	0.70	0.10	108.14	35.30	1.63	0.20	2.15	5.11	9.67	11.30	4.98	3.55	3.15	2.52	0.46	0.46	0.46	0.46

Aircraft
T-43
Number of Engines:

Engine
JT8D-9A
2

Fuel Flow (Kg/s)			
Idle	App	Climbout	Takeoff
0.1323	0.2977	0.8453	1.0400

VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
3.120	0.600	0.180	0.150	14.140	2.140	1.110	1.040	2.900	6.000	14.500	19.300	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46

Aircraft
T-6
Number of Engines:

Engine
PT6A-68
1

Fuel Flow (lb/hr)			
Idle	App	Int	Mil
191	334	587	651

Aircraft UAV Number of Engines:	Engine Rotax 914F 1	VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)							
		Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil				
		25.20	4.20	0.30	0.20	73.40	23.70	6.90	5.20	2.70	4.40	6.40	8.80	0.00	0.00	0.00	0.00	0.46	0.46	0.46	0.46				
Aircraft UH-1N Number of Engines:	Engine T400-CP-400 1	Fuel Flow (lb/hr)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
		Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil	Idle	App	Int	Mil				
		0.0010	0.0032	0.0057	0.0057	29.00	33.20	20.80	20.80	644.00	1188.00	974.00	974.00	1.60	1.10	4.87	4.87	0.05	0.05	0.05	0.05	0.46	0.46	0.46	0.46
Aircraft AH-1W Number of Engines:	Engine T700-GE-401/401C 4 (2 ea.)	Fuel Flow (lb/hr)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
		Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff
		432	348	443	442	0.12	0.12	0.12	0.12	0.88	0.88	0.88	0.88	5.78	5.78	5.78	5.78	0.11	0.15	0.33	0.34	0.46	0.46	0.46	0.46
Aircraft UH-60 Number of Engines:	Engine T700-GE-700 2	Fuel Flow (Kg/s)				VOC Emission Index (lb/1000 lb)				CO Emission Index (lb/1000 lb)				NO _x Emission Index (lb/1000 lb)				PM ₁₀ Emission Index (lb/1000 lb)				SO _x Emission Index (lb/1000 lb)			
		Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff
		0.0168	0.0630	0.0742	0.0890	0.54	0.54	0.53	0.53	10.46	10.46	10.11	10.15	5.36	5.36	5.60	5.59	0.12	0.21	0.46	0.53	0.46	0.46	0.46	0.46
Aircraft AV-8 Number of Engines:	Engine F402-RR-406A 2	Fuel Flow (Kg/s)				VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
		Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
		0.1433	0.4615	0.8866	1.0100	56.670	0.370	0.490	0.390	53.180	5.250	3.750	3.090	2.780	7.560	8.610	19.300	0.050	0.050	0.050	0.050	0.46	0.46	0.46	0.46
Aircraft B-707 Number of Engines:	Engine JT3D-3B 4	Fuel Flow (Kg/s)				VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
		Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
		0.1350	0.3460	0.9320	1.1740	2.817	0.508	0.434	0.424	15.233	9.922	5.674	4.949	0.258	2.308	8.423	10.908	0.007	0.023	0.044	0.051	0.46	0.46	0.46	0.46
Aircraft B-707 Number of Engines:	Engine JT3D-3B 4	Fuel Flow (Kg/s)				VOC Emission Index (g/Kg)				CO Emission Index (g/Kg)				NO _x Emission Index (g/Kg)				PM ₁₀ Emission Index (g/Kg)				SO _x Emission Index (lb/1000 lb)			
		Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Climbout	Takeoff	Idle	App	Int	Mil
		0.1350	0.3460	0.9320	1.1740	15.120	1.384	1.864	4.696	13.230	8.477	2.610	1.761	0.338	1.661	9.227	14.205	0.007	0.017	0.047	0.059	0.46	0.46	0.46	0.46

Notes:

Total emissions per aircraft sortie for a particular pollutant are totaled by adding emissions from each TIM cycle.

Aircraft engine emissions for F-15 were used to calculate emissions for the F-22 and F-35/JSF.

Aircraft engine emissions for CH-53 were used to calculate emissions for the CH-47 and MH-47.

Aircraft engine emissions for UH-1 were used to calculate emissions for the CH-146.

Aircraft engine emissions for Cessna 150 were used to calculate emissions for the UAV (assuming Raptor).

This action does not include flight operations in idle, climbout or takeoff modes. Only operation considered in this EA is approach mode.

0.0173
0.0466
0.00675
0.0587

References:

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USEPA 2002. *Commercial Aircraft 2002*. Available online: <<http://www.epa.state.oh.us/dapc/transfer/airport/CommercialAircraft2002.xls>>. Accessed 2 October 2008.

USAF IERA 2003. U.S. Air Force. *Air Emissions Inventory Guidance Document for Stationary Emissions*. Revised version: 2003.

USEPA AirData Tier Report for Portions of Georgia, Florida, and Alabama That Fall Within Proposed Action's Airspace Operations

Row #	State	County	AQCR	Attainment Status	Area Source Emissions						Point Source Emissions					
					CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	AL	Barbour Co	Southeast Alabama Intrastate AQCR	Attainment	108	348	141	30	133	325	20,564	1,638	3,993	1,226	528	4,845
2	AL	Bullock Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	47,965	1,081	7,700	3,899	799	10,917
3	AL	Coffee Co	Southeast Alabama Intrastate AQCR	Attainment	5	11	52	22	0.02	31	19,589	2,023	4,838	1,181	675	3,881
4	AL	Conecuh Co	Alabama and Tombigbee Rivers Intrastate AQCR	Attainment	1	4	24	4	0.01	158	18,511	1,813	2,806	904	268	3,313
5	AL	Covington Co	Southeast Alabama Intrastate AQCR	Attainment	67	123	7	6	2.76	34	32,182	2,147	6,111	2,185	869	6,976
6	AL	Crenshaw Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	8,206	790	2,639	601	177	1,723
7	AL	Dale Co	Southeast Alabama Intrastate AQCR	Attainment	80	103	12	4	142	591	29,547	3,655	4,589	913	594	4,853
8	AL	Escambia Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	18,420	2,251	498	316	19,432	3,164	37,366	3,033	6,364	2,403	946	8,003
9	AL	Geneva Co	Southeast Alabama Intrastate AQCR	Attainment	0	0	0	0	0	141	15,571	1,346	5,141	1,417	339	3,197
10	AL	Henry Co	Southeast Alabama Intrastate AQCR	Attainment	0	0	3	2	0	36	10,140	1,174	3,668	793	228	2,066
11	AL	Houston Co	Southeast Alabama Intrastate AQCR	Attainment	8	25.5	19	16.1	0.1	100	34,944	4,719	7,607	1,468	2,139	7,175
12	AL	Lee Co	Columbus-Phenix City Interstate AQCR	Attainment	299	344	175	75	10.3	805	36,964	4,823	5,345	1,129	1,534	6,691
13	AL	Macon Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	26,698	2,211	3,921	1,520	360	4,411
14	AL	Pike Co	Columbus-Phenix City Interstate AQCR	Attainment	3,791	117	21	10	7,996	77	18,448	2,075	4,139	1,145	550	3,425
15	AL	Russell Co	Columbus-Phenix City Interstate AQCR	Attainment	5,656	2,662	808	682	7,324	1,801	32,461	2,757	5,149	1,734	890	6,869
16	FL	Alachua Co	Jacksonville-Brunswick Interstate AQCR	Attainment	1,205	4,574	520	424	7,570	447	98,106	10,188	8,373	2,639	938	18,904
17	FL	Baker Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	1	1	0	2.89	102,375	3,525	10,111	7,547	1,591	22,195
18	FL	Bay Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	6,293	7,203	1,766	1,357	16,143	1,413	60,035	6,028	4,298	1,236	924	13,440
19	FL	Bradford Co	Jacksonville-Brunswick Interstate AQCR	Attainment	180	1,078	232	81	232	349	19,540	1,487	2,305	775	234	3,370
20	FL	Calhoun Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	0	0	0	0	0	0	10,628	606	2,291	809	137	2,274
21	FL	Clay Co	Jacksonville-Brunswick Interstate AQCR	Attainment	48	81.7	154	71	311	20	67,725	5,480	6,623	2,781	1,084	14,278
22	FL	Columbia Co	Jacksonville-Brunswick Interstate AQCR	Attainment	6	13	1	0	5.17	28	93,496	7,041	8,697	5,076	1,269	17,683
23	FL	Dixie Co	Jacksonville-Brunswick Interstate AQCR	Attainment	111	20	125	55	1.85	278	14,097	847	1,657	681	186	3,067
24	FL	Duval Co	Jacksonville-Brunswick Interstate AQCR	Attainment	3,560	33,286	3,239	2,648	38,216	1,959	299,945	39,335	9,574	3,103	13,747	55,912
25	FL	Gadsden Co	Jacksonville-Brunswick Interstate AQCR	Attainment	471	1,116	330	84	37.4	469	36,513	4,958	3,904	1,292	456	6,279
26	FL	Gilchrist Co	Jacksonville-Brunswick Interstate AQCR	Attainment	39	32	0	0	7.82	1	10,932	886	1,724	551	137	1,795
27	FL	Hamilton Co	Jacksonville-Brunswick Interstate AQCR	Attainment	17	218	192	153	2,264	5	16,592	2,717	1,977	626	144	2,321
28	FL	Holmes Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	0	0	0	0	0	0	12,964	1,922	2,143	581	171	2,207
29	FL	Jackson Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	213	1,274	277	214	2,790	251	38,371	5,159	6,252	1,593	427	6,557
30	FL	Jefferson Co	Jacksonville-Brunswick Interstate AQCR	Attainment	43	35	5	4	1.8	3	49,299	2,922	5,026	3,258	700	9,957
31	FL	Lafayette Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	19	4,733	422	939	268	54	881
32	FL	Leon Co	Jacksonville-Brunswick Interstate AQCR	Attainment	203	855	61	52.3	245	65.3	124,210	9,647	10,403	4,699	1,469	24,138
33	FL	Liberty Co	Jacksonville-Brunswick Interstate AQCR	Attainment	1,259	180	98	79	17.3	191	28,015	671	3,242	2,161	433	6,260
34	FL	Madison Co	Jacksonville-Brunswick Interstate AQCR	Attainment	8	6	0	0	3.79	6	25,561	3,718	3,100	994	290	4,093
35	FL	Marion Co	Jacksonville-Brunswick Interstate AQCR	Attainment	552	766	2,354	750	52.1	571	164,609	15,192	17,679	6,947	1,738	31,862
36	FL	Nassau Co	Jacksonville-Brunswick Interstate AQCR	Attainment	4,090	3,790	944	517	5,038	1,658	52,507	5,434	5,147	2,553	911	10,097
37	FL	Okaloosa Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	28	49	8	6	11.5	79.1	96,594	7,864	7,846	3,710	1,418	19,157
38	FL	Santa Rosa Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	867	4,570	332	275	2,362	418	85,511	7,211	9,677	3,663	1,144	17,225
39	FL	St. Johns Co	Jacksonville-Brunswick Interstate AQCR	Attainment	13	19.5	13	11	18.8	241	58,960	10,477	5,790	1,719	2,334	10,549
40	FL	Suwannee Co	Jacksonville-Brunswick Interstate AQCR	Attainment	155	1,229	93	75	4,103	47	30,693	4,094	3,667	1,179	252	4,534
41	FL	Taylor Co	Jacksonville-Brunswick Interstate AQCR	Attainment	8,957	2,573	798	513	2,922	919	13,024	1,111	1,664	490	136	2,887
42	FL	Union Co	Jacksonville-Brunswick Interstate AQCR	Attainment	72	11.9	23	9	2.18	159	11,305	392	1,649	580	134	2,117
43	FL	Wakulla Co	Jacksonville-Brunswick Interstate AQCR	Attainment	96	218	76	72	112	303	33,804	1,731	3,596	1,902	465	7,123
44	FL	Walton Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	25	14.4	2	0.59	4.31	28.3	52,111	5,390	4,828	1,954	543	9,706
45	FL	Washington Co	Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	Attainment	99	791	17	10.9	9.57	34.6	20,626	2,637	2,142	716	240	3,656
46	GA	Appling Co	Jacksonville-Brunswick Interstate AQCR	Attainment	191	70	13	12	7.94	304	9,647	1,192	3,748	771	190	1,803
47	GA	Atkinson Co	Jacksonville-Brunswick Interstate AQCR	Attainment	130	68	186	186	47.8	215	6,523	626	2,070	520	157	1,219
48	GA	Bacon Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	0	4,934	849	2,104	457	173	802
49	GA	Baker Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	22,176	530	3,723	2,034	341	5,179
50	GA	Baldwin Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	13,633	1,684	3,359	554	428	2,652
51	GA	Barrow Co	Northeast Georgia Intrastate AQCR	Nonattainment	180	22	63	54.3	1.2	7.94	18,902	2,424	4,618	904	416	2,838
52	GA	Ben Hill Co	Central Georgia Intrastate AQCR	Attainment	150	41	175	73.7	5.65	393	7,190	1,246	2,440	582	528	1,373
53	GA	Berrien Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	221	10,738	993	4,048	1,055	293	2,121
54	GA	Bibb Co	Central Georgia Intrastate AQCR	Nonattainment	2,340	2,922	514	317	2,679	2,102	56,108	6,993	5,724	944	1,455	9,289
55	GA	Bleckley Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	8,319	796	2,100	538	250	1,298
56	GA	Brantley Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	0	6,581	978	2,323	457	93	1,119
57	GA	Brooks Co	Southwest Georgia Intrastate AQCR	Attainment	226	82.9	173	173	0	187	17,365	1,137	4,527	1,600	319	3,642
58	GA	Bryan Co	Savannah-Beaufort Interstate AQCR	Attainment	0	0	0	0	0	0	24,618	2,370	3,737	1,246	255	4,056
59	GA	Bulloch Co	Savannah-Beaufort Interstate AQCR	Attainment	0	0	0	0	0	0	24,438	2,887	8,133	1,617	482	4,038

Row #	State	County	AQCR	Attainment Status	Area Source Emissions						Point Source Emissions					
					CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
60	GA	Burke Co	Augusta-Aiken Interstate AQCR	Attainment	0	0	0	0	0	0	12,623	1,612	5,826	1,349	296	2,420
61	GA	Butts Co	Metropolitan Atlanta Intrastate AQCR	Attainment	0	0	0	0	0	0	9,726	1,594	2,331	415	191	1,574
62	GA	Calhoun Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	8,795	472	2,025	852	141	1,943
63	GA	Camden Co	Jacksonville-Brunswick Interstate AQCR	Attainment	43	139	0	0	11.3	23	26,298	2,876	3,555	790	588	4,621
64	GA	Candler Co	Savannah-Beaufort Interstate AQCR	Attainment	0	0	0	0	0	0	6,697	843	1,936	429	90.2	993
65	GA	Charlton Co	Jacksonville-Brunswick Interstate AQCR	Attainment	19	44	1	1	21.5	167	8,812	1,319	2,209	731	156	1,702
66	GA	Chatham Co	Savannah-Beaufort Interstate AQCR	Attainment	3,644	9,029	1,034	649	19,082	1,354	81,049	18,973	5,748	1,740	4,682	16,122
67	GA	Chattahoochee Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	2,590	364	658	139	22	495
68	GA	Clarke Co	Northeast Georgia Intrastate AQCR	Attainment	46	602	222	211	259	112	28,959	3,848	3,886	620	924	5,625
69	GA	Clay Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	2,560	226	1,288	215	13.8	684
70	GA	Clinch Co	Jacksonville-Brunswick Interstate AQCR	Attainment	5	6.23	1	0.37	0.04	161	7,112	893	1,233	477	152	2,177
71	GA	Coffee Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	0	16,901	2,219	5,950	1,277	639	3,216
72	GA	Colquitt Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	20,930	1,895	7,307	1,794	543	4,618
73	GA	Columbia Co	Augusta-Aiken Interstate AQCR	Attainment	18	22.4	0	0	3.86	469	31,421	3,593	4,764	1,056	688	5,505
74	GA	Cook Co	Southwest Georgia Intrastate AQCR	Attainment	128	87	232	204	8.37	263	13,533	1,712	2,940	698	279	2,268
75	GA	Crawford Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	4,370	604	2,090	338	51	692
76	GA	Crisp Co	Southwest Georgia Intrastate AQCR	Attainment	119	29.5	66	35.4	23.1	370	15,278	2,167	3,944	834	342	2,486
77	GA	Decatur Co	Southwest Georgia Intrastate AQCR	Attainment	104	171	265	264	14.8	4	36,210	1,984	7,432	2,914	786	8,599
78	GA	Dodge Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	8,977	940	3,517	834	134	1,679
79	GA	Dooly Co	Columbus-Phenix City Interstate AQCR	Attainment	3	2	57	55	0.22	55	14,121	2,045	5,087	1,068	307	2,014
80	GA	Dougherty Co	Southwest Georgia Intrastate AQCR	Attainment	1,475	2,975	410	310	6,773	389	40,557	3,602	4,262	1,516	1,174	8,705
81	GA	Early Co	Southwest Georgia Intrastate AQCR	Attainment	1,693	3,260	522	367	6,604	698	8,158	959	3,720	911	207	1,514
82	GA	Echols Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	2,825	447	786	247	39.9	749
83	GA	Effingham Co	Savannah-Beaufort Interstate AQCR	Attainment	3,530	4,916	474	380	11,021	550	15,840	2,870	5,187	1,075	410	2,660
84	GA	Elbert Co	Northeast Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	8,673	1,215	2,783	467	355	1,497
85	GA	Emanuel Co	Augusta-Aiken Interstate AQCR	Attainment	3	16	0	0	0.1	201	12,309	1,432	4,148	986	314	2,163
86	GA	Evans Co	Savannah-Beaufort Interstate AQCR	Attainment	143	66	34	12.3	6	202	5,449	592	2,253	492	221	1,156
87	GA	Franklin Co	Northeast Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	14,102	1,985	2,894	423	280	1,799
88	GA	Glascock Co	Augusta-Aiken Interstate AQCR	Attainment	46	56	138	41	5.76	3	1,194	142	729	147	11.2	209
89	GA	Glynn Co	Jacksonville-Brunswick Interstate AQCR	Attainment	9,834	2,477	656	521	2,467	2,054	33,721	5,605	3,601	895	2,089	6,130
90	GA	Grady Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	15,680	1,203	4,190	1,256	246	3,150
91	GA	Greene Co	Northeast Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	12,432	1,451	2,073	473	222	2,021
92	GA	Hancock Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	5,514	542	1,827	377	54	1,017
93	GA	Harris Co	Columbus-Phenix City Interstate AQCR	Attainment	85	199	0	0	0	12.3	18,360	1,840	3,762	932	276	2,889
94	GA	Henry Co	Metropolitan Atlanta Intrastate AQCR	Nonattainment	705	2,352	0	0.22	0.09	487	57,155	7,940	11,350	2,109	733	6,990
95	GA	Houston Co	Central Georgia Intrastate AQCR	Attainment	4,403	3,016	457	242	1,396	476	37,673	4,657	5,466	1,012	540	6,136
96	GA	Irwin Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	5,753	996	2,761	642	148	1,106
97	GA	Jackson Co	Northeast Georgia Intrastate AQCR	Attainment	343	355	151	51	1.39	149	29,240	3,733	5,108	995	622	3,654
98	GA	Jasper Co	Central Georgia Intrastate AQCR	Attainment	1,601	158	414	292	0.23	332	10,002	791	2,284	716	201	1,948
99	GA	Jeff Davis Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	7,859	830	2,934	698	280	1,422
100	GA	Jefferson Co	Augusta-Aiken Interstate AQCR	Attainment	58	133	233	76	9.46	4	9,227	1,302	4,744	895	236	1,558
101	GA	Jenkins Co	Augusta-Aiken Interstate AQCR	Attainment	0	0	0	0	0	0	4,987	767	1,974	496	183	847
102	GA	Johnson Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	4,976	500	2,168	517	109	929
103	GA	Jones Co	Central Georgia Intrastate AQCR	Attainment	128	110	1	0.74	0.21	1.55	14,706	1,489	3,793	1,012	190	2,722
104	GA	Lamar Co	Metropolitan Atlanta Intrastate AQCR	Attainment	0	0	0	0	0	0	7,513	1,013	1,860	372	203	1,274
105	GA	Lanier Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	6,255	452	1,789	486	81.3	1,429
106	GA	Laurens Co	Central Georgia Intrastate AQCR	Attainment	555	932	716	238	1,540	515	26,863	3,126	6,152	1,461	672	4,213
107	GA	Lee Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	133	20,404	1,042	5,795	1,902	307	4,316
108	GA	Liberty Co	Savannah-Beaufort Interstate AQCR	Attainment	55,263	1,879	7,160	7,136	235	607	30,732	2,999	4,890	1,561	507	5,995
109	GA	Lincoln Co	Augusta-Aiken Interstate AQCR	Attainment	0	0	0	0	0	0	6,173	425	1,515	284	55	1,623
110	GA	Long Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	0	5,264	644	1,565	385	53	923
111	GA	Lowndes Co	Southwest Georgia Intrastate AQCR	Attainment	3,378	1,065	366	287	1,194	1,766	45,133	5,077	8,822	1,819	859	7,588
112	GA	Macon Co	Central Georgia Intrastate AQCR	Attainment	1,380	965	182	135	185	418	6,821	1,093	3,148	731	177	1,273
113	GA	Madison Co	Northeast Georgia Intrastate AQCR	Attainment	834	3,082	9	8.31	0	286	8,806	1,374	4,081	648	375	1,786
114	GA	Marion Co	Columbus-Phenix City Interstate AQCR	Attainment	5	3.23	27	13.8	0.21	184	4,907	485	1,698	426	226	885
115	GA	McDuffie Co	Augusta-Aiken Interstate AQCR	Attainment	168	205	200	137	0	270	11,669	1,403	2,973	577	277	1,831
116	GA	McIntosh Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	0	16,747	2,546	2,036	523	685	3,215
117	GA	Meriwether Co	Metropolitan Atlanta Intrastate AQCR	Attainment	1,471	177	149	87.8	3	241	12,168	1,702	3,791	807	335	2,175
118	GA	Miller Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	5,309	491	3,081	712	67.5	993
119	GA	Mitchell Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	21,232	1,456	5,592	1,873	622	4,531
120	GA	Monroe Co	Central Georgia Intrastate AQCR	Nonattainment	2,546	27,626	2,849	2,507	86,350	356	23,037	3,266	2,746	607	202	2,823
121	GA	Montgomery Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	4,361	424	1,846	396	45.4	739
122	GA	Morgan Co	Northeast Georgia Intrastate AQCR	Attainment	804	88.8	204	70.7	4.43	124	15,095	1,873	2,323	558	272	2,251

Row #	State	County	AQCR	Attainment Status	Area Source Emissions						Point Source Emissions					
					CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
123	GA	Muscogee Co	Columbus-Phenix City Interstate AQCR	Attainment	322	20.3	202	97.2	0.03	186	44,226	5,649	3,082	684	1,894	8,884
124	GA	Newton Co	Northeast Georgia Intrastate AQCR	Nonattainment	1	1.23	5	1.44	0.02	735	28,750	3,538	7,352	1,377	706	4,312
125	GA	Oconee Co	Northeast Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	13,467	1,794	3,492	509	201	2,023
126	GA	Oglethorpe Co	Northeast Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	6,135	629	1,954	351	51	975
127	GA	Peach Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	14,309	2,135	3,240	524	433	1,993
128	GA	Pierce Co	Jacksonville-Brunswick Interstate AQCR	Attainment	138	17.4	51	28.2	1.7	173	7,393	1,264	2,934	562	117	1,140
129	GA	Pike Co	Metropolitan Atlanta Intrastate AQCR	Attainment	0	0	0	0	0	0	6,407	655	2,223	442	62	1,055
130	GA	Pulaski Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	769	5,265	519	2,683	621	95	990
131	GA	Putnam Co	Central Georgia Intrastate AQCR	Nonattainment	1,045	27,864	5,490	4,250	73,950	385	11,958	1,281	2,369	628	303	2,167
132	GA	Quitman Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	1,715	175	624	98.7	14.1	383
133	GA	Randolph Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	6,920	520	1,480	630	126	1,431
134	GA	Richmond Co	Augusta-Aiken Interstate AQCR	Attainment	21,268	6,401	1,122	795	6,290	1,562	57,405	6,873	5,833	1,317	1,370	11,907
135	GA	Rockdale Co	Metropolitan Atlanta Intrastate AQCR	Nonattainment	11	30.6	0	0.13	0.61	161	24,403	3,588	6,696	860	868	4,391
136	GA	Schley Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	1,520	238	1,035	209	79	361
137	GA	Screven Co	Augusta-Aiken Interstate AQCR	Attainment	0	0	0	0	0	0	8,402	1,019	3,896	834	213	1,555
138	GA	Seminole Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	9,268	637	1,662	700	117	2,136
139	GA	Spalding Co	Metropolitan Atlanta Intrastate AQCR	Nonattainment	1	1.8	2	2.37	0.3	65.2	20,168	2,504	5,653	824	680	3,860
140	GA	Stewart Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	8,669	576	2,072	755	131	1,651
141	GA	Sumter Co	Columbus-Phenix City Interstate AQCR	Attainment	57	498	580	286	581	1,093	14,177	1,486	5,093	1,177	369	2,812
142	GA	Talbot Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	5,971	882	1,529	406	83	1,057
143	GA	Taliaferro Co	Augusta-Aiken Interstate AQCR	Attainment	0	0	0	0	0	0	3,325	482	564	116	26	373
144	GA	Tattnall Co	Savannah-Beaufort Interstate AQCR	Attainment	0	0	0	0	0	0	7,617	899	3,744	761	86.6	1,391
145	GA	Taylor Co	Columbus-Phenix City Interstate AQCR	Attainment	0	0	0	0	0	0	5,148	903	2,384	471	74	830
146	GA	Telfair Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	6,721	726	2,670	699	271	1,324
147	GA	Terrell Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	8,559	779	2,952	801	189	1,587
148	GA	Thomas Co	Southwest Georgia Intrastate AQCR	Attainment	184	125	158	90	99.1	321	58,672	2,674	9,987	4,568	1,256	12,632
149	GA	Tift Co	Southwest Georgia Intrastate AQCR	Attainment	5	7	93	27	2.83	203	21,817	2,679	4,915	890	562	3,168
150	GA	Toombs Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	9,450	1,157	2,696	556	290	1,717
151	GA	Treutlen Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	5,376	646	1,062	281	55	763
152	GA	Troup Co	Metropolitan Atlanta Intrastate AQCR	Attainment	8	19.6	14	8.6	0.03	425	31,314	4,225	5,422	1,024	1,263	5,438
153	GA	Turner Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	10,726	1,685	2,386	582	143	1,460
154	GA	Twiggs Co	Central Georgia Intrastate AQCR	Attainment	91	111	341	276	10.5	5.9	9,567	1,134	2,268	497	69	1,306
155	GA	Upson Co	Metropolitan Atlanta Intrastate AQCR	Attainment	18	130	0	0.17	0.02	49.3	9,379	1,138	3,276	564	440	1,687
156	GA	Walton Co	Northeast Georgia Intrastate AQCR	Nonattainment	3	3.98	0	0.15	0.02	117	25,743	2,850	5,593	1,170	409	4,209
157	GA	Ware Co	Jacksonville-Brunswick Interstate AQCR	Attainment	0	0	0	0	0	20	33,034	2,527	6,169	2,324	497	6,959
158	GA	Warren Co	Augusta-Aiken Interstate AQCR	Attainment	140	51.1	15	6.98	0	167	5,659	822	1,329	243	126	727
159	GA	Washington Co	Central Georgia Intrastate AQCR	Attainment	270	328	609	369	76.6	222	10,703	1,283	3,495	874	176	2,044
160	GA	Wayne Co	Jacksonville-Brunswick Interstate AQCR	Attainment	5,684	1,456	723	431	2,808	2,017	10,899	1,731	3,385	699	303	1,985
161	GA	Webster Co	Columbus-Phenix City Interstate AQCR	Attainment	39	43	29	12.9	2	175	3,212	300	1,193	343	56	592
162	GA	Wheeler Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	4,016	404	1,456	388	40	717
163	GA	Wilcox Co	Central Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	5,259	700	2,924	720	96.2	1,070
164	GA	Wilkes Co	Augusta-Aiken Interstate AQCR	Attainment	0	0	0	0	0	0	5,610	669	1,552	354	217	981
165	GA	Wilkinson Co	Central Georgia Intrastate AQCR	Attainment	243	523	1,167	405	420	34.3	6,577	905	2,365	545	215	1,106
166	GA	Worth Co	Southwest Georgia Intrastate AQCR	Attainment	0	0	0	0	0	0	12,831	1,302	5,501	1,169	137	2,292
167	SC	Allendale Co	Augusta-Aiken Interstate AQCR	Attainment	14	25	26	13	48	112	8,142	808	1,917	652	113	1,897
168	SC	Beaufort Co	Savannah-Beaufort Interstate AQCR	Attainment	71	306	39	27	203	38	65,084	7,731	5,749	1595	2295	11,670
169	SC	Hampton Co	Savannah-Beaufort Interstate AQCR	Attainment	98	158	139	84	507	2,268	15,658	1,445	3,321	1009	250	3,058
170	SC	Jasper Co	Savannah-Beaufort Interstate AQCR	Attainment	4	33	22	15	5	15	32,736	3,657	3,012	1030	650	4,509
Total					184,271	176,740	42,206	30,829	341,641	42,734	3,892,818	421,690	636,790	184,361	89,188	730,260

SOURCE:
USEPA - AirData NET Tier Report
http://www.epa.gov/air/data/geosel.html
Site visited on 8 April 2009
*Net Air pollution sources (area and point) in tons per year (2002)
Site visited on 8 April 2009.

USEPA AirData Tier Report for Southeast Alabama Intrastate AQCR

Row #	State	County	Area Source Emissions						Point Source Emissions					
			CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	AL	Barbour Co	108	348	141	30	133	325	20,564	1,638	3,993	1,226	528	4,845
2	AL	Coffee Co	5	11	52	22	0	31	19,589	2,023	4,838	1,181	675	3,881
3	AL	Covington Co	67	123	7	6	3	34	32,182	2,147	6,111	2,185	869	6,976
4	AL	Dale Co	80	103	12	4	142	591	29,547	3,655	4,589	913	594	4,853
5	AL	Geneva Co	0	0	0	0	0	141	15,571	1,346	5,141	1,417	339	3,197
6	AL	Henry Co	0	0	3	2	0	36	10,140	1,174	3,668	793	228	2,066
7	AL	Houston Co	8	26	19	16	0	100	34,944	4,719	7,607	1,468	2,139	7,175
Total			267	610	234	82	278	1,257	162,537	16,702	35,947	9,183	5,372	32,993

USEPA AirData Tier Report for Columbus-Phenix City Interstate AQCR

Row #	State	Area Source Emissions					Point Source Emissions					PM2.5	SO2	VOC
		County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10			
1	AL	Autauga Co	4,206	2,329	476	464	2,673	6,696	16,323	2,508	3,275	653	485	3,057
2	AL	Bullock Co	0	0	0	0	0	0	47,965	1,081	7,700	3,899	799	10,917
3	AL	Butler Co	194	38	93	59	24	509	19,245	2,216	3,133	728	373	3,486
4	GA	Chattahoochee Co	0	0	0	0	0	0	2,590	364	658	139	22.2	495
5	AL	Crenshaw Co	0	0	0	0	0	0	8,206	790	2,639	601	177	1,723
6	GA	Dooly Co	3	2	57	55	0	55	14,121	2,045	5,087	1,068	307	2,014
7	AL	Elmore Co	249	932	33	21	180	59	21,941	2,765	6,206	1,154	504	4,777
8	GA	Harris Co	85	199	0	0	0	12	18,360	1,840	3,762	932	276	2,889
9	AL	Lee Co	299	344	175	75	10	805	36,964	4,823	5,345	1,129	1,534	6,691
10	AL	Lowndes Co	416	186	115	59	42	59	12,415	1,673	2,839	566	174	2,463
11	AL	Macon Co	0	0	0	0	0	0	26,698	2,211	3,921	1,520	360	4,411
12	GA	Marion Co	5	3	27	14	0	184	4,907	485	1,698	426	226	885
13	AL	Montgomery Co	1,121	1,177	185	126	807	538	83,280	10,236	6,906	1,560	5,813	16,095
14	GA	Muscogee Co	322	20	202	97	0	186	44,226	5,649	3,082	684	1,894	8,884
15	AL	Pike Co	3,791	117	21	10	7,996	77	18,448	2,075	4,139	1,145	550	3,425
16	GA	Quitman Co	0	0	0	0	0	0	1,715	175	624	99	14.1	383
17	AL	Russell Co	5,656	2,662	808	682	7,324	1,801	32,461	2,757	5,149	1,734	890	6,869
18	GA	Schley Co	0	0	0	0	0	0	1,520	238	1,035	209	79	361
19	GA	Stewart Co	0	0	0	0	0	0	8,669	576	2,072	755	131	1,651
20	GA	Sumter Co	57	498	580	286	581	1,093	14,177	1,486	5,093	1,177	369	2,812
21	GA	Talbot Co	0	0	0	0	0	0	5,971	882	1,529	406	83.1	1,057
22	GA	Taylor Co	0	0	0	0	0	0	5,148	903	2,384	471	73.7	830
23	GA	Webster Co	39	43	29	13	2	175	3,212	300	1,193	343	56	592
Total			16,444	8,550	2,800	1,961	19,640	12,249	448,562	48,078	79,469	21,398	15,190	86,767

USEPA AirData Tier Report for Alabama and Tombigbee Rivers Intrastate AQCR

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	AL	Choctaw Co	1,014	2,292	343	265	3,573	563	10,605	963	2,909	644	207	2,898
2	AL	Clarke Co	1,248	550	351	293	980	523	21,770	1,758	3,954	1,335	516	5,141
3	AL	Conecuh Co	1	4	24	4	0	158	18,511	1,813	2,806	904	268	3,313
4	AL	Dallas Co	2,839	2,029	534	392	4,453	667	17,117	2,630	4,510	1,080	1,179	4,113
5	AL	Marengo Co	3,826	11,666	541	291	461	915	15,087	1,974	3,109	773	666	3,528
6	AL	Monroe Co	6,311	2,500	923	603	2,480	815	11,479	1,662	4,270	908	500	2,669
7	AL	Perry Co	0	0	0	0	0	0	6,663	677	2,283	507	248	1,575
8	AL	Washington Co	1,822	10,765	1,224	1,052	20,327	1,151	15,972	1,251	3,480	1,026	257	4,237
9	AL	Wilcox Co	13,751	2,128	841	508	2,315	2,204	17,861	1,309	3,508	1,405	422	3,753
Total			30,812	31,934	4,781	3,408	34,589	6,996	135,065	14,037	30,829	8,582	4,263	31,227

USEPA AirData Tier Report for Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR

Row #	State	Area Source Emissions					Point Source Emissions					PM2.5	SO2	VOC
		County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10			
1	AL	Baldwin Co	32.3	0	10.2	8.31	0	50.4	136,884	11,121	20,259	8,012	3,373	28,656
2	FL	Bay Co	6,293	7,203	1,766	1,357	16,143	1,413	60,035	6,028	4,298	1,236	924	13,440
3	FL	Calhoun Co	0	0	0	0	0	0	10,628	606	2,291	809	137	2,274
4	AL	Escambia Co	18,420	2,251	498	316	19,432	3,164	37,366	3,033	6,364	2,403	946	8,003
5	FL	Escambia Co	2,912	17,794	9,125	7,744	43,578	2,268	105,737	11,578	8,578	1,713	1,102	21,193
6	FL	Gulf Co	41.5	59.9	19.9	10.3	0.33	39	13,918	3,782	1,949	900	1,878	3,191
7	FL	Holmes Co	0	0	0	0	0	0	12,964	1,922	2,143	581	171	2,207
8	FL	Jackson Co	213	1,274	277	214	2,790	251	38,371	5,159	6,252	1,593	427	6,557
9	AL	Mobile Co	11,537	33,866	3,993	3,034	68,859	3,519	125,877	16,798	15,498	3,670	9,501	29,203
10	FL	Okaloosa Co	28	49	8	6	12	79	96,594	7,864	7,846	3,710	1,418	19,157
11	FL	Santa Rosa Co	867	4,570	332	275	2,362	418	85,511	7,211	9,677	3,663	1,144	17,225
12	FL	Walton Co	25	14	2	1	4	28	52,111	5,390	4,828	1,954	543	9,706
13	FL	Washington Co	99	791	17	11	10	35	20,626	2,637	2,142	716	240	3,656
14	MS	Adams Co	1,114	1,834	925	636	1,399	902	13,074	3,375	4,092	842	183	3,573
15	MS	Amite Co	388	129	449	138	14	452	5,234	635	2,618	345	59	944
16	MS	Claiborne Co	166	97	162	64	7	200	4,455	2,748	2,098	443	142	1,137
17	MS	Clarke Co	753	764	177	110	2,449	495	6,338	1,507	2,489	340	133	1,217
18	MS	Copiah Co	160	102	180	79	7	258	11,991	2,315	3,216	464	179	2,196
19	MS	Covington Co	81	371	55	10	45	798	9,075	1,429	2,824	364	112	1,450
20	MS	Forrest Co	570	1,137	347	190	197	732	23,950	3,505	3,684	685	300	5,001
21	MS	Franklin Co	74	38	63	21	1	88	4,392	548	1,703	270	31	773
22	MS	George Co	0	0	0	0	0	0	5,670	821	2,622	352	51	1,100
23	MS	Greene Co	1	2	0	0	1	20	4,537	674	1,865	262	47	1,042
24	MS	Hancock Co	131	855	81	47	80	92	19,504	3,259	3,179	697	177	3,669
25	MS	Harrison Co	8,011	13,861	1,733	1,224	28,388	1,894	64,323	9,681	9,026	2,188	924	13,314
26	MS	Hinds Co	620	1,527	400	133	232	726	79,041	12,085	11,454	2,298	818	17,174
27	MS	Jackson Co	3,557	16,888	1,931	1,383	34,322	8,494	54,531	15,824	8,318	2,312	1,403	23,978
28	MS	Jasper Co	508	1,266	163	69	9	419	7,292	1,465	2,894	383	105	1,307
29	MS	Jefferson Co	422	1,597	0	0	0	97	4,198	2,721	1,986	404	135	865
30	MS	Jefferson Davis Co	144	1,041	12	12	0	37	4,343	496	2,358	306	34	888
31	MS	Jones Co	695	10,192	410	254	70	863	24,872	3,942	6,624	988	391	4,883
32	MS	Lamar Co	276	6,443	386	331	10,499	215	14,334	2,205	3,954	633	130	2,802
33	MS	Lauderdale Co	177	202	199	111	10	1,051	33,374	4,833	5,635	953	344	6,676
34	MS	Lawrence Co	7,168	2,972	1,533	1,197	3,137	1,202	4,209	553	2,214	301	66.8	921
35	MS	Lincoln Co	36	53	150	60	0	186	13,387	2,372	3,976	592	144	2,545
36	MS	Madison Co	242	64	124	64	29	378	25,193	4,413	8,124	1,239	316	5,477
37	MS	Marion Co	117	30	114	38	26	330	8,045	1,027	3,315	452	92.4	1,803
38	MS	Newton Co	508	63	203	80	2	265	10,270	2,151	2,979	416	144	2,110
Total			66,386	129,400	25,845	19,225	234,114	31,459	1,252,254	167,713	195,372	49,489	28,265	271,313

USEPA AirData Tier Report for Jacksonville-Brunswick Interstate AQCR

		Area Source Emissions						Point Source Emissions						
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	FL	Alachua Co	1,205	4,574	520	424	7,570	447	98,106	10,188	8,373	2,639	938	18,904
2	FL	Baker Co	0	0	1	1	0	3	102,375	3,525	10,111	7,547	1,591	22,195
3	FL	Bradford Co	180	1,078	232	81.1	232	349	19,540	1,487	2,305	775	234	3,370
4	FL	Clay Co	48	82	154	71	311	20	67,725	5,480	6,623	2,781	1,084	14,278
5	FL	Columbia Co	6	13	1	0	5	28	93,496	7,041	8,697	5,076	1,269	17,683
6	FL	Dixie Co	111	20	125	55	2	278	14,097	847	1,657	681	186	3,067
7	FL	Duval Co	3,560	33,286	3,239	2,648	38,216	1,959	299,945	39,335	9,574	3,103	13,747	55,912
8	FL	Flagler Co	0	0	0	0	0	131	30,887	4,878	2,463	869	1,094	5,248
9	FL	Franklin Co	0	0	0	0	0	0	42,182	1,760	4,125	2,866	950	9,724
10	FL	Gadsden Co	471	1,116	330	84	37	469	36,513	4,958	3,904	1,292	456	6,279
11	FL	Gilchrist Co	39	32	0	0	8	1	10,932	886	1,724	551	137	1,795
12	FL	Hamilton Co	17	218	192	153	2,264	5	16,592	2,717	1,977	626	144	2,321
13	FL	Jefferson Co	43	35	5	4	2	3	49,299	2,922	5,026	3,258	700	9,957
14	FL	Lafayette Co	0	0	0	0	0	19	4,733	422	939	268	54	881
15	FL	Leon Co	203	855	61	52	245	65	124,210	9,647	10,403	4,699	1,469	24,138
16	FL	Liberty Co	1,259	180	98	79	17	191	28,015	671	3,242	2,161	433	6,260
17	FL	Madison Co	8	6	0	0	4	6	25,561	3,718	3,100	994	290	4,093
18	FL	Marion Co	552	766	2,354	750	52	571	164,609	15,192	17,679	6,947	1,738	31,862
19	FL	Nassau Co	4,090	3,790	944	517	5,038	1,658	52,507	5,434	5,147	2,553	911	10,097
20	FL	Putnam Co	7,268	29,123	2,654	2,020	29,910	770	51,676	3,543	7,170	2,583	598	12,009
21	FL	St. Johns Co	13	20	13	11	19	241	58,960	10,477	5,790	1,719	2,334	10,549
22	FL	Suwannee Co	155	1,229	93	75	4,103	47	30,693	4,094	3,667	1,179	252	4,534
23	FL	Taylor Co	8,957	2,573	798	513	2,922	919	13,024	1,111	1,664	490	136	2,887
24	FL	Union Co	72	12	23	9	2	159	11,305	392	1,649	580	134	2,117
25	FL	Wakulla Co	96	218	76	72	112	303	33,804	1,731	3,596	1,902	465	7,123
26	GA	Appling Co	191	70	13	12	8	304	9,647	1,192	3,748	771	190	1,803
27	GA	Atkinson Co	130	67.9	186	186	47.8	215	6,523	626	2,070	520	157	1,219
28	GA	Bacon Co	0	0	0	0	0	0	4,934	849	2,104	457	173	802
29	GA	Brantley Co	0	0	0	0	0	0	6,581	978	2,323	457	93	1,119
30	GA	Camden Co	43.4	139	0.24	0.22	11	22.7	26,298	2,876	3,555	790	588	4,621
31	GA	Charlton Co	19	44	1	1	22	167	8,812	1,319	2,209	731	156	1,702
32	GA	Clinch Co	5	6	1	0	0	161	7,112	893	1,233	477	152	2,177
33	GA	Coffee Co	0	0	0	0	0	0	16,901	2,219	5,950	1,277	639	3,216
34	GA	Glynn Co	9,834	2,477	656	521	2,467	2,054	33,721	5,605	3,601	895	2,089	6,130
35	GA	Long Co	0	0	0	0	0	0	5,264	644	1,565	385	53	923
36	GA	McIntosh Co	0	0	0	0	0	0	16,747	2,546	2,036	523	685	3,215
37	GA	Pierce Co	138	17	51	28	2	173	7,393	1,264	2,934	562	117	1,140
38	GA	Ware Co	0	0	0	0	0	20	33,034	2,527	6,169	2,324	497	6,959
39	GA	Wayne Co	5,684	1,456	723	431	2,808	2,017	10,899	1,731	3,385	699	303	1,985
Total			44,397	83,503	13,543	8,799	96,436	13,774	1,674,652	167,725	173,487	69,007	37,236	324,294

USEPA AirData Tier Report for Southwest Georgia Intrastate AQCR

Row #	State	Area Source Emissions					Point Source Emissions					PM2.5	SO2	VOC
		County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10			
1	GA	Baker Co	0	0	0	0	0	0	22,176	530	3,723	2,034	341	5,179
2	GA	Berrien Co	0	0	0	0	0	221	10,738	993	4,048	1,055	293	2,121
3	GA	Brooks Co	226	82.9	173	173	0	187	17,365	1,137	4,527	1,600	319	3,642
4	GA	Calhoun Co	0	0	0	0	0	0	8,795	472	2,025	852	141	1,943
5	GA	Clay Co	0	0	0	0	0	0	2,560	226	1,288	215	14	684
6	GA	Colquitt Co	0	0	0	0	0	0	20,930	1,895	7,307	1,794	543	4,618
7	GA	Cook Co	128	87.2	232	204	8.37	263	13,533	1,712	2,940	698	279	2,268
8	GA	Crisp Co	119	30	65.5	35.4	23	370	15,278	2,167	3,944	834	342	2,486
9	GA	Decatur Co	104	171	265	264	15	4	36,210	1,984	7,432	2,914	786	8,599
10	GA	Dougherty Co	1,475	2,975	410	310	6,773	389	40,557	3,602	4,262	1,516	1,174	8,705
11	GA	Early Co	1,693	3,260	522	367	6,604	698	8,158	959	3,720	911	207	1,514
12	GA	Echols Co	0	0	0	0	0	0	2,825	447	786	247	39.9	749
13	GA	Grady Co	0	0	0	0	0	0	15,680	1,203	4,190	1,256	246	3,150
14	GA	Irwin Co	0	0	0	0	0	0	5,753	996	2,761	642	148	1,106
15	GA	Lanier Co	0	0	0	0	0	0	6,255	452	1,789	486	81	1,429
16	GA	Lee Co	0	0	0	0	0	133	20,404	1,042	5,795	1,902	307	4,316
17	GA	Lowndes Co	3,378	1,065	366	287	1,194	1,766	45,133	5,077	8,822	1,819	859	7,588
18	GA	Miller Co	0	0	0	0	0	0	5,309	491	3,081	712	68	993
19	GA	Mitchell Co	0	0	0	0	0	0	21,232	1,456	5,592	1,873	622	4,531
20	GA	Randolph Co	0	0	0	0	0	0	6,920	520	1,480	630	126	1,431
21	GA	Seminole Co	0	0	0	0	0	0	9,268	637	1,662	700	117	2,136
22	GA	Terrell Co	0	0	0	0	0	0	8,559	779	2,952	801	189	1,587
23	GA	Thomas Co	184	125	158	90	99	321	58,672	2,674	9,987	4,568	1,256	12,632
24	GA	Tift Co	5	7	93	27	3	203	21,817	2,679	4,915	890	562	3,168
25	GA	Turner Co	0	0	0	0	0	0	10,726	1,685	2,386	582	143	1,460
26	GA	Worth Co	0	0	0	0	0	0	12,831	1,302	5,501	1,169	137	2,292
Total			7,312	7,803	2,284	1,758	14,719	4,555	447,684	37,117	106,915	32,700	9,340	90,327

USEPA AirData Tier Report for Savannah-Beaufort Interstate AQCR

Row #	State	Area Source Emissions				PM2.5	SO2	Point Source Emissions				PM2.5	SO2	VOC
		County	CO	NOx	PM10			VOC	CO	NOx	PM10			
1	SC	Beaufort Co	71	306	38.8	27.2	203	38	65,084	7,731	5,749	1,595	2,295	11,670
2	GA	Bryan Co	0	0	0	0	0	0	24,618	2,370	3,737	1,246	255	4,056
3	GA	Bulloch Co	0	0	0	0	0	0	24,438	2,887	8,133	1,617	482	4,038
4	GA	Candler Co	0	0	0	0	0	0	6,697	843	1,936	429	90.2	993
5	GA	Chatham Co	3,644	9,029	1,034	649	19,082	1,354	81,049	18,973	5,748	1,740	4,682	16,122
6	SC	Colleton Co	405	4,456	320	227	18,628	326	37,930	3,423	5,438	1,640	494	6,544
7	GA	Effingham Co	3,530	4,916	474	380	11,021	550	15,840	2,870	5,187	1,075	410	2,660
8	GA	Evans Co	143	66	33.8	12.3	6	202	5,449	592	2,253	492	221	1,156
9	SC	Hampton Co	98	158	139	84	507	2,268	15,658	1,445	3,321	1,009	250	3,058
10	SC	Jasper Co	4	33	22	15	5	15	32,736	3,657	3,012	1,030	650	4,509
11	GA	Liberty Co	55,263	1,879	7,160	7,136	235	607	30,732	2,999	4,890	1,561	507	5,995
12	GA	Tattnall Co	0	0	0	0	0	0	7,617	899	3,744	761	86.6	1,391
Total			63,158	20,843	9,222	8,530	49,687	5,360	347,848	48,689	53,148	14,195	10,423	62,192

USEPA AirData Tier Report for Augusta-Aiken Interstate AQCR

Row #	State	Area Source Emissions					Point Source Emissions					PM2.5	SO2	VOC
		County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10			
1	SC	Aiken Co	775	8,569	1,724	1,291	18,634	1,055	57,780	6,681	8,068	1,596	1,594	9,932
2	SC	Allendale Co	14	25	26	13	48	112	8,142	808	1,917	652	113	1,897
3	SC	Bamberg Co	44.3	9.31	6.82	5.44	7.05	12.8	7,274	786	2,290	479	132	1,353
4	SC	Barnwell Co	20	73	16.1	14.5	68	217	7,427	1,181	1,927	393	242	1,880
5	GA	Burke Co	0	0	0	0	0	0	12,623	1,612	5,826	1,349	296	2,420
6	SC	Calhoun Co	284	38	22.3	11.9	59	107	14,573	1,578	3,632	690	140	2,249
7	GA	Columbia Co	18	22	0	0	4	469	31,421	3,593	4,764	1,056	688	5,505
8	GA	Emanuel Co	3	16	0.32	0.3	0	201	12,309	1,432	4,148	986	314	2,163
9	GA	Glascocock Co	46	56	138	40.8	6	3	1,194	142	729	147	11.2	209
10	GA	Jefferson Co	58	133	233	75.6	9	3.76	9,227	1,302	4,744	895	236	1,558
11	GA	Jenkins Co	0	0	0	0	0	0	4,987	767	1,974	496	183	847
12	GA	Lincoln Co	0	0	0	0	0	0	6,173	425	1,515	284	54.8	1,623
13	GA	McDuffie Co	168	205	200	137	0	270	11,669	1,403	2,973	577	277	1,831
14	SC	Orangeburg Co	732	8,122	1,566	812	5,992	1,936	52,416	5,652	11,189	2,243	805	10,682
15	GA	Richmond Co	21,268	6,401	1,122	795	6,290	1,562	57,405	6,873	5,833	1,317	1,370	11,907
16	GA	Screven Co	0	0	0	0	0	0	8,402	1,019	3,896	834	213	1,555
17	GA	Taliaferro Co	0	0	0	0	0	0	3,325	482	564	116	25.7	373
18	GA	Warren Co	140	51	14.7	6.98	0	167	5,659	822	1,329	243	126	727
19	GA	Wilkes Co	0	0	0	0	0	0	5,610	669	1,552	354	217	981
Total			23,570	23,721	5,069	3,204	31,117	6,116	317,616	37,227	68,870	14,707	7,038	59,692

USEPA AirData Tier Report for Central Georgia Intrastate AQCR

Row #	State	Area Source Emissions					Point Source Emissions					PM2.5	SO2	VOC
		County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10			
1	GA	Ben Hill Co	150	41	175	74	6	393	7,190	1,246	2,440	582	528	1,373
2	GA	Bibb Co	2,340	2,922	514	317	2,679	2,102	56,108	6,993	5,724	944	1,455	9,289
3	GA	Bleckley Co	0	0	0	0	0	0	8,319	796	2,100	538	250	1,298
4	GA	Crawford Co	0	0	0	0	0	0	4,370	604	2,090	338	51	692
5	GA	Dodge Co	0	0	0	0	0	0	8,977	940	3,517	834	134	1,679
6	GA	Hancock Co	0	0	0	0	0	0	5,514	542	1,827	377	54	1,017
7	GA	Houston Co	4,403	3,016	457	242	1,396	476	37,673	4,657	5,466	1,012	540	6,136
8	GA	Jasper Co	1,601	158	414	292	0	332	10,002	791	2,284	716	201	1,948
9	GA	Jeff Davis Co	0	0	0	0	0	0	7,859	830	2,934	698	280	1,422
10	GA	Johnson Co	0	0	0	0	0	0	4,976	500	2,168	517	109	929
11	GA	Jones Co	128	110	0.74	0.74	0	1.55	14,706	1,489	3,793	1,012	190	2,722
12	GA	Laurens Co	555	932	716	238	1,540	515	26,863	3,126	6,152	1,461	672	4,213
13	GA	Macon Co	1,380	965	182	135	185	418	6,821	1,093	3,148	731	177	1,273
14	GA	Monroe Co	2,546	27,626	2,849	2,507	86,350	356	23,037	3,266	2,746	607	202	2,823
15	GA	Montgomery Co	0	0	0	0	0	0	4,361	424	1,846	396	45	739
16	GA	Peach Co	0	0	0	0	0	0	14,309	2,135	3,240	524	433	1,993
17	GA	Pulaski Co	0	0	0	0	0	769	5,265	519	2,683	621	94.9	990
18	GA	Putnam Co	1,045	27,864	5,490	4,250	73,950	385	11,958	1,281	2,369	628	303	2,167
19	GA	Telfair Co	0	0	0	0	0	0	6,721	726	2,670	699	271	1,324
20	GA	Toombs Co	0	0	0	0	0	0	9,450	1,157	2,696	556	290	1,717
21	GA	Wilcox Co	0	0	0	0	0	0	5,259	700	2,924	720	96.2	1,070
22	GA	Wilkinson Co	243	523	1,167	405	420	34	6,577	905	2,365	545	215	1,106
Total			14,391	64,157	11,965	8,460	166,526	5,782	286,315	34,720	67,182	15,056	6,592	47,920

USEPA AirData Tier Report for Northeast Georgia Intrastate AQCR

Row #	State	Area Source Emissions					Point Source Emissions							
		County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	GA	Barrow Co	180	22	63	54	1	8	18,902	2,424	4,618	904	416	2,838
2	GA	Clarke Co	46	602	222	211	259	112	28,959	3,848	3,886	620	924	5,625
3	GA	Dawson Co	0	0	0	0	0	0	9,671	850	2,369	514	105	1,419
4	GA	Elbert Co	0	0	0	0	0	0	8,673	1,215	2,783	467	355	1,497
5	GA	Forsyth Co	40	46	3	1	8	177	45,674	4,818	9,907	1,693	654	5,890
6	GA	Franklin Co	0	0	0	0	0	0	14,102	1,985	2,894	423	280	1,799
7	GA	Greene Co	0	0	0	0	0	0	12,432	1,451	2,073	473	222	2,021
8	GA	Habersham Co	0	0	0	0	0	0	14,852	2,104	4,739	799	541	2,534
9	GA	Hall Co	89	108	3.18	0.69	579	246	57,419	7,406	15,023	2,301	2,445	10,284
10	GA	Hart Co	138	115	3.42	3.42	2	3.54	10,748	1,240	2,979	484	360	2,627
11	GA	Jackson Co	343	355	151	51	1	149	29,240	3,733	5,108	995	622	3,654
12	GA	Lumpkin Co	0	0	0	0	0	0	8,688	1,115	2,556	489	145	1,323
13	GA	Macon Co	1,380	965	182	135	185	418	6,821	1,093	3,148	731	177	1,273
14	GA	Morgan Co	804	89	204	71	4	124	15,095	1,873	2,323	558	272	2,251
15	GA	Newton Co	1	1	5	1.44	0	735	28,750	3,538	7,352	1,377	706	4,312
16	GA	Oconee Co	0	0	0	0	0	0	13,467	1,794	3,492	509	201	2,023
17	GA	Oglethorpe Co	0	0	0	0	0	0	6,135	629	1,954	351	50.5	975
18	GA	Rabun Co	314	117	44	4	13	8.91	9,210	954	2,583	518	243	1,772
19	GA	Stephens Co	0	0	0	0	0	0	9,517	1,329	2,990	511	448	2,244
20	GA	Towns Co	0	0	0	0	0	0	4,745	480	1,556	284	38	812
21	GA	Union Co	0	0	0	0	0	0	9,261	1,011	2,703	557	93.5	1,440
22	GA	Walton Co	3.34	4	0.28	0.15	0	117	25,743	2,850	5,593	1,170	409	4,209
23	GA	White Co	0	0	0	0	0	0	7,917	867	2,838	416	119	1,594
Total			3,338	2,424	880	533	1,053	2,098	396,021	48,607	95,467	17,144	9,826	64,416

USEPA AirData Tier Report for Metropolitan Atlanta Intrastate AQCR

Row #	State	County	Area Source Emissions						Point Source Emissions					
			CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
1	GA	Butts Co	0	0	0	0	0	0	9,726	1,594	2,331	415	191	1,574
2	GA	Carroll Co	223	24	60	45	5	309	38,815	5,054	10,249	1,867	1,193	5,823
3	GA	Clayton Co	52.3	109	105	57.4	0.04	472	71,269	15,451	4,442	787	1,423	10,744
4	GA	Cobb Co	596	5,380	1,659	1,428	28,880	322	197,281	25,378	12,999	2,479	3,735	30,488
5	GA	Coweta Co	599	9,184	2,574	2,210	41,518	215	41,071	5,346	9,155	1,664	874	5,031
6	GA	DeKalb Co	278	179	1.83	1.41	4	1,708	208,635	27,363	10,919	2,234	3,752	32,556
7	GA	Douglas Co	16	21	1.31	0.59	12	28.4	40,802	5,550	5,312	1,143	538	5,211
8	GA	Fayette Co	0	0	0	0	0	0	28,112	3,636	7,477	1,204	696	4,230
9	GA	Fulton Co	371	2,660	451	385	2,236	1,979	293,109	44,442	16,879	3,535	5,765	48,589
10	GA	Gwinnett Co	82	33	0.05	0.03	0	49	218,294	25,604	17,628	3,103	4,234	33,710
11	GA	Heard Co	1,751	20,338	4,244	3,633	73,600	164	6,308	556	1,904	420	98	1,314
12	GA	Henry Co	705	2,352	0.22	0.22	0	487	57,155	7,940	11,350	2,109	733	6,990
13	GA	Lamar Co	0	0	0	0	0	0	7,513	1,013	1,860	372	203	1,274
14	GA	Meriwether Co	1,471	177	149	88	3	241	12,168	1,702	3,791	807	335	2,175
15	GA	Pike Co	0	0	0	0	0	0	6,407	655	2,223	442	62	1,055
16	GA	Rockdale Co	11	31	0.37	0.13	1	161	24,403	3,588	6,696	860	868	4,391
17	GA	Spalding Co	1	2	2.37	2.37	0	65.2	20,168	2,504	5,653	824	680	3,860
18	GA	Troup Co	8	20	14	9	0	425	31,314	4,225	5,422	1,024	1,263	5,438
19	GA	Upson Co	18	130	0.17	0.17	0	49.3	9,379	1,138	3,276	564	440	1,687
Total			6,184	40,639	9,263	7,860	146,259	6,675	1,321,929	182,739	139,566	25,853	27,083	206,140

AQCR area within the LATN, MOAs, MTRs, and Ranges

	Alabama & Tombigbee Rivers AQCR	Augusta-Aiken AQCR		Central Georgia AQCR	Columbus- Phenix City AQCR	Jacksonville- Brunswick AQCR	Metropolitan Atlanta AQCR	Mobile- Pensacola- Panama City- Southern Mississippi AQCR;	Northeast Georgia AQCR	Savannah- Beaufort AQCR	Southeast Alabama AQCR	Southwest Georgia AQCR	Total
LATN	18.600672	4683.941157	0	9924.301884	6018.93644	18304.06714	1747.773122	3513.085979	2575.238822	4559.2476	4808.356762	10174.98909	66328.53867
Bulldog A		892.758071		501.993938						20.915685			1394.752009
Bulldog B		1650.929446		550.218472									2222.063603
Live Oak						1599.516203							1599.516203
Moody 1				359.002825	59.088289	1039.447073						4778.298666	6235.836853
Moody 2 North						376.301464						44.439602	420.741066
Moody 2 South						235.528351						300.991086	536.519437
Moody 3						24.966507					61.84302	1577.92797	1664.737497
Coastal 1 East						490.9994				182.560026			673.559426
Coastal 1 West						406.133273				0.114638			406.247911
Townsend Range						221.061891							221.061891
Grand Bay Range												123.227772	123.227772

Bulldog A MOA: 1394.07366
Bulldog B MOA: 2222.152845
Live Oak: 1599.51624
Moody 1 MOA: 6241.355
Moody 2 North: 420.691
Moody 2 South: 536.52267
Moody 3 MOA: 1664.816764
Coastal 1 East: 674.119698
Coastal 1 West: 406.317761
Townsend Range: 221.066052
Grand Bay Range: 123.226671

AQCR	LATN area (sq. miles)	AQCR area (sq. miles)	Percent of LATN area	Regional Emissions						Baseline Emissions						Proposed Emissions						
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	
Alabama and Tombigbee Rivers Intrastate AQCR	66,328.54	18.60	0.03%	165,877	45,971	35,610	11,990	38,852	38,223	0.02	0.01	0.01			0.00	0.00	0.02	0.01	0.01		0.00	0.00
Augusta-Aiken Interstate AQCR	66,328.54	4,683.94	7.06%	341,186	60,948	73,939	17,911	38,155	65,808	5.99	1.99	1.62		0.17	0.40	0.62	2.05	1.63		0.17	0.40	
Central Georgia Interstate AQCR	66,328.54	9,924.30	14.96%	300,706	98,877	79,147	23,516	173,118	53,702	12.69	4.22	3.43		0.35	0.85	12.77	4.34	3.46		0.36	0.85	
Columbus-Phenix City Interstate AQCR	66,328.54	6,018.94	9.07%	465,006	56,628	82,269	23,359	34,830	99,016	7.70	2.56	2.08		0.21	0.51	7.74	2.63	2.10		0.22	0.52	
Jacksonville-Brunswick Interstate AQCR	66,328.54	18,304.07	27.60%	1,719,049	251,228	187,030	77,806	133,672	338,068	23.41	7.78	6.32		0.65	1.56	23.54	8.00	6.38		0.66	1.58	
Metropolitan Atlanta Intrastate AQCR	66,328.54	1,747.77	2.64%	1,328,113	223,378	148,829	33,713	173,342	212,815	2.23	0.74	0.60		0.06	0.15	2.25	0.76	0.61		0.06	0.15	
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	66,328.54	3,513.09	5.30%	1,318,640	297,113	221,217	68,714	262,379	302,772	4.49	1.49	1.21		0.12	0.30	4.52	1.53	1.22		0.13	0.30	
Northeast Georgia Interstate AQCR	66,328.54	2,575.24	3.88%	399,359	51,031	96,347	17,677	10,879	66,514	3.29	1.09	0.89		0.09	0.22	3.31	1.13	0.90		0.09	0.22	
Savannah-Beaufort Interstate AQCR	66,328.54	4,559.25	6.87%	411,006	69,532	62,370	22,725	60,110	67,552	5.83	1.94	1.57		0.16	0.39	5.86	1.99	1.59		0.17	0.39	
Southeast Alabama Interstate AQCR	66,328.54	4,808.36	7.25%	8,206	790	2,639	601	177	1,723	6.15	2.04	1.66		0.17	0.41	6.18	2.10	1.68		0.17	0.41	
Southwest Georgia Intrastate AQCR	66,328.54	10,174.99	15.34%	454,996	44,920	109,199	34,458	24,059	94,882	13.01	4.32	3.51		0.36	0.87	13.09	4.45	3.54		0.37	0.88	
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	84.82	28.19	22.89	0.00	2.36	5.65	85.32	28.98	23.11	0.00	2.40	5.71	

AQCR	Buildout A area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	1,394.75	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	1,394.75	892.76	64.01%	341,186	60,948	73,939	17,911	38,155	65,806	2.22	1.87	0.76		0.09	0.28	3.41	2.06	1.05		0.11	0.35
Central Georgia Interstate AQCR	1,394.75	501.99	35.99%	300,706	98,877	79,147	23,516	173,118	53,702	1.25	0.95	0.43		0.05	0.16	1.92	1.16	0.59		0.06	0.19
Columbus-Phenix City Interstate AQCR	1,394.75	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	1,394.75	0.00	0.00%	1,719,049	251,228	187,030	77,806	133,672	338,068	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Metropolitan Atlanta Intrastate AQCR	1,394.75	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern	1,394.75	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Interstate AQCR	1,394.75	0.00	0.00%	399,359	51,031	17,677	10,879	66,514	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	1,394.75	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Interstate AQCR	1,394.75	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	1,394.75	0.00	0.00%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	3.47	2.93	1.19	0.00	0.15	0.43	5.33	3.22	1.64	0.00	0.18	0.54

[illegible]

Regional, Baseline and Proposed Emissions by AQCR for Live Oak

AQCR	Live Oak area	AQCR area (sq. miles)	Percent of Range area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	1,599.52	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	1,599.52	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	1,599.52	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	1,599.52	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	1,599.52	1,599.52	100.00%	1,719,049	251,228	187,030	77,806	133,672	338,068	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Metropolitan Atlanta Intrastate AQCR	1,599.52	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	1,599.52	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	1,599.52	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	1,599.52	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	1,599.52	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	1,599.52	0.00	0.00%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Regional, Baseline and Proposed Emissions by AQCR for Moody 1

AQCR	Moody 1 area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	6,235.84	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	6,235.84	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	6,235.84	359.00	5.76%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	6,235.84	59.09	0.95%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	6,235.84	1,039.45	16.67%	1,719,049	251,228	187,030	77,806	133,672	338,068	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Metropolitan Atlanta Intrastate AQCR	6,235.84	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	6,235.84	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	6,235.84	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	6,235.84	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	6,235.84	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	6,235.84	4,778.30	76.63%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Regional, Baseline and Proposed Emissions by AQCR for Moody 2 North

AQCR	Moody 2 North area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	420.74	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	420.74	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	420.74	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	420.74	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	420.74	376.30	89.44%	1,719,049	251,228	187,030	77,806	133,672	338,068	28.75	11.67	8.75		0.92	2.13	28.99	11.79	9.05		0.93	2.18
Metropolitan Atlanta Intrastate AQCR	420.74	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	420.74	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	420.74	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	420.74	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	420.74	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	420.74	44.44	10.56%	454,996	44,920	109,199	34,458	24,059	94,882	3.40	1.38	1.03		0.11	0.25	3.42	1.39	1.07		0.11	0.26
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	32.15	13.05	9.78	0.00	1.03	2.38	32.42	13.18	10.11	0.00	1.05	2.43

Regional, Baseline and Proposed Emissions by AQCR for Moody 2 South

AQCR	Moody 2 South area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	536.52	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	536.52	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	536.52	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	536.52	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	536.52	235.53	43.90%	1,719,049	251,228	187,030	77,806	133,672	338,068	1.69	2.52	0.76		0.15	0.23	17.54	5.81	4.49		0.49	1.16
Metropolitan Atlanta Intrastate AQCR	536.52	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	536.52	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	536.52	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	536.52	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	536.52	0.00	0.00%		8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	536.52	300.99	56.10%	454,996	44,920	109,199	34,458	24,059	94,882	2.15	3.22	0.97		0.20	0.29	22.41	7.43	5.74		0.62	1.48
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	3.84	5.75	1.72	0.00	0.35	0.51	39.95	13.24	10.22	0.00	1.11	2.64

Regional, Baseline and Proposed Emissions by AQCR for Moody 3

AQCR	Moody 3 area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	1,664.74	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	1,664.74	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	1,664.74	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	1,664.74	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	1,664.74	24.97	1.50%	1,719,049	251,228	187,030	77,806	133,672	338,068	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Metropolitan Atlanta Intrastate AQCR	1,664.74	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	1,664.74	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	1,664.74	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	1,664.74	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	1,664.74	61.84	3.71%		8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	1,664.74	1,577.93	94.79%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Regional, Baseline and Proposed Emissions by AQCR for Coastal 1 East

AQCR	Coastal 1 East area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	673.56	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	673.56	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	673.56	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	673.56	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	673.56	491.00	72.90%	1,719,049	251,228	187,030	77,806	133,672	338,068	7.34	26.96	10.31		1.15	2.58	8.68	27.17	10.63		1.17	2.66
Metropolitan Atlanta Intrastate AQCR	673.56	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	673.56	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	673.56	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	673.56	182.56	27.10%	411,006	69,532	62,370	22,725	60,110	67,552	2.73	10.02	3.83		0.43	0.96	3.23	10.10	3.95		0.44	0.99
Southeast Alabama Intrastate AQCR	673.56	0.00	0.00%		8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	673.56	0.00	0.00%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	10.06	36.98	14.14	0.00	1.57	3.54	11.90	37.27	14.58	0.00	1.61	3.65

Regional, Baseline and Proposed Emissions by AQCR for Coastal 1 West

AQCR	Coastal 1 West area	AQCR area (sq. miles)	Percent of MOA area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	406.25	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	406.25	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	406.25	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	406.25	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	406.25	406.13	99.97%	1,719,049	251,228	187,030	77,806	133,672	338,068	10.06	36.97	14.13		1.57	3.54	11.90	37.26	14.58		1.61	3.65
Metropolitan Atlanta Intrastate AQCR	406.25	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	406.25	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	406.25	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	406.25	0.11	0.03%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.01	0.00		0.00	0.00	0.00	0.01	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	406.25	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	406.25	0.00	0.00%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	10.06	36.98	14.14	0.00	1.57	3.54	11.90	37.27	14.58	0.00	1.61	3.65

Regional, Baseline and Proposed Emissions by AQCR for Townsend Range

AQCR	Townsend area	AQCR area (sq. miles)	Percent of Range area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	221.06	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	221.06	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	221.06	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	221.06	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	221.06	221.06	100.00%	1,719,049	251,228	187,030	77,806	133,672	338,068	20.54	80.18	30.41		3.40	7.63	22.38	80.47	30.86		3.43	7.73
Metropolitan Atlanta Intrastate AQCR	221.06	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	221.06	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	221.06	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	221.06	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	221.06	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	221.06	0.00	0.00%	454,996	44,920	109,199	34,458	24,059	94,882	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Total			100.00%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	20.54	80.18	30.41	0.00	3.40	7.63	22.38	80.47	30.86	0.00	3.43	7.73

Regional, Baseline and Proposed Emissions by AQCR for Grand Bay Range

AQCR	Grand Bay area	AQCR area (sq. miles)	Percent of Range area	Regional Emissions						Baseline Emissions						Proposed Emissions					
				CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	123.22	0.00	0.00%	165,877	45,971	35,610	11,990	38,852	38,223	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Augusta-Aiken Interstate AQCR	123.22	0.00	0.00%	341,186	60,948	73,939	17,911	38,155	65,808	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Central Georgia Intrastate AQCR	123.22	0.00	0.00%	300,706	98,877	79,147	23,516	173,118	53,702	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Columbus-Phenix City Interstate AQCR	123.22	0.00	0.00%	465,006	56,628	82,269	23,359	34,830	99,016	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Jacksonville-Brunswick Interstate AQCR	123.22	0.00	0.00%	1,719,049	251,228	187,030	77,806	133,672	338,068	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Metropolitan Atlanta Intrastate AQCR	123.22	0.00	0.00%	1,328,113	223,378	148,829	33,713	173,342	212,815	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	123.22	0.00	0.00%	1,318,640	297,113	221,217	68,714	262,379	302,772	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Northeast Georgia Intrastate AQCR	123.22	0.00	0.00%	399,359	51,031	96,347	17,677	10,879	66,514	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Savannah-Beaufort Interstate AQCR	123.22	0.00	0.00%	411,006	69,532	62,370	22,725	60,110	67,552	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southeast Alabama Intrastate AQCR	123.22	0.00	0.00%	8,206	790	2,639	601	177	1,723	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00
Southwest Georgia Intrastate AQCR	123.22	123.23	100.01%	454,996	44,920	109,199	34,458	24,059	94,882	42.21	10.10	10.66		0.95	2.62	54.13	15.56	14.03		1.38	3.49
Total			100.01%	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	42.21	10.10	10.66	0.00	0.95	2.62	54.13	15.56	14.03	0.00	1.38	3.49

Emissions summary by AQCR

	Regional Emissions						Baseline Emissions						Proposed Emissions					
AQCR	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	165,877	45,971	35,610	11,990	38,852	38,223	0.024	0.008	0.006	0.000	0.001	0.002	0.024	0.008	0.006	0.000	0.001	0.002
Augusta-Aiken Interstate AQCR	341,186	60,948	73,939	17,911	38,155	65,808	8.210	3.865	2.381	0.000	0.260	0.675	9.438	4.107	2.684	0.000	0.285	0.749
Central Georgia Intrastate AQCR	300,706	98,877	79,147	23,516	173,118	53,702	13.939	5.272	3.855	0.000	0.405	1.001	14.684	5.495	4.049	0.000	0.424	1.049
Columbus-Phenix City Interstate AQCR	465,006	56,628	82,269	23,359	34,830	99,016	7.697	2.558	2.077	0.000	0.214	0.513	7.742	2.630	2.097	0.000	0.218	0.518
Jacksonville-Brunswick Interstate AQCR	1,719,049	251,228	187,030	77,806	133,672	338,068	93.350	167.537	70.901	0.000	7.950	17.846	113.029	170.490	75.973	0.000	8.293	18.959
Metropolitan Atlanta Intrastate AQCR	1,328,113	223,378	148,829	33,713	173,342	212,815	2.235	0.743	0.603	0.000	0.062	0.149	2.248	0.764	0.609	0.000	0.063	0.151
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	1,318,640	297,113	221,217	68,714	262,379	302,772	4.492	1.493	1.213	0.000	0.125	0.299	4.519	1.535	1.224	0.000	0.127	0.303
Northeast Georgia Intrastate AQCR	399,359	51,031	96,347	17,677	10,879	66,514	3.293	1.095	0.889	0.000	0.091	0.219	3.312	1.125	0.897	0.000	0.093	0.222
Savannah-Beaufort Interstate AQCR	411,006	69,532	62,370	22,725	60,110	67,552	8.560	11.971	5.409	0.000	0.589	1.350	9.094	12.103	5.545	0.000	0.601	1.383
Southeast Alabama Intrastate AQCR	8,206	790	2,639	601	1,723	6,149	2.044	1.660	0.000	0.171	0.410	6.185	2.101	1.675	0.000	0.174	0.414	
Southwest Georgia Intrastate AQCR	454,996	44,920	109,199	34,458	24,059	94,882	60.767	19.031	16.172	0.000	1.619	4.023	93.052	28.823	24.375	0.000	2.485	6.103
Total	6,912,144	1,200,415	1,098,596	332,470	949,573	1,341,074	208.71	215.62	105.17	0.00	11.49	26.49	263.33	229.18	119.14	0.00	12.77	29.85

Delta Change in Emissions

	NOx	VOC	CO	PM10	SOx
Alabama and Tombigbee Rivers Intrastate AQCR	0.000	0.000	0.000	0.000	0.000
Augusta-Aiken Interstate AQCR	0.242	0.074	1.228	0.303	0.025
Central Georgia Intrastate AQCR	0.223	0.048	0.746	0.194	0.019
Columbus-Phenix City Interstate AQCR	0.071	0.006	0.045	0.020	0.004
Jacksonville-Brunswick Interstate AQCR	2.953	1.113	19.679	5.072	0.343
Metropolitan Atlanta Intrastate AQCR	0.021	0.002	0.013	0.006	0.001
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	0.042	0.003	0.027	0.011	0.003
Northeast Georgia Intrastate AQCR	0.030	0.002	0.019	0.008	0.002
Savannah-Beaufort Interstate AQCR	0.132	0.033	0.533	0.135	0.012
Southeast Alabama Intrastate AQCR	0.057	0.004	0.036	0.016	0.004
Southwest Georgia Intrastate AQCR	9.793	2.079	32.285	8.204	0.867

Regional Emissions

	Regional Emissions					
	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	165,877	45,971	35,610	11,990	38,852	38,223
Augusta-Aiken Interstate AQCR	341,186	60,948	73,939	17,911	38,155	65,808
Central Georgia Intrastate AQCR	300,706	98,877	79,147	23,516	173,118	53,702
Columbus-Phenix City Interstate AQCR	465,006	56,628	82,269	23,359	34,830	99,016
Jacksonville-Brunswick Interstate AQCR	1,719,049	251,228	187,030	77,806	133,672	338,068
Metropolitan Atlanta Intrastate AQCR	1,328,113	223,378	148,829	33,713	173,342	212,815
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	1,318,640	297,113	221,217	68,714	262,379	302,772
Northeast Georgia Intrastate AQCR	399,359	51,031	96,347	17,677	10,879	66,514
Savannah-Beaufort Interstate AQCR	411,006	69,532	62,370	22,725	60,110	67,552
Southeast Alabama Intrastate AQCR	8,206	790	2,639	601	177	1,723
Southwest Georgia Intrastate AQCR	454,996	44,920	109,199	34,458	24,059	94,882

Percentage of Regional Emissions

	CO	NOx	PM10	PM2.5	SO2	VOC
Alabama and Tombigbee Rivers Intrastate AQCR	8.46217E-10	4.78799E-09	1.69813E-09	0	3.4982E-10	4.48465E-10
Augusta-Aiken Interstate AQCR	3.60016E-06	3.97708E-06	4.09963E-06	0	6.5043E-07	1.11866E-06
Central Georgia Intrastate AQCR	2.47983E-06	2.25096E-06	2.45299E-06	0	1.1138E-07	8.95924E-07
Columbus-Phenix City Interstate AQCR	9.76788E-08	1.25774E-06	2.37843E-07	0	1.2627E-07	5.60196E-08
Jacksonville-Brunswick Interstate AQCR	1.14478E-05	1.17545E-05	2.71212E-05	0	2.569E-06	3.29188E-06
Metropolitan Atlanta Intrastate AQCR	9.93091E-09	9.25871E-08	3.81774E-08	0	7.3673E-09	7.56847E-09
Mobile-Pensacola-Panama City-Southern Mississippi Interstate AQCR	2.01049E-08	1.39917E-07	5.16271E-08	0	9.7833E-09	1.0693E-08
Northeast Georgia Intrastate AQCR	4.86623E-08	5.97162E-07	8.68932E-08	0	1.7296E-07	3.56802E-08
Savannah-Beaufort Interstate AQCR	1.29704E-06	1.89996E-06	2.1672E-06	0	2.042E-07	4.91034E-07
Southeast Alabama Intrastate AQCR	4.42185E-06	7.20235E-05	5.92332E-06	0	1.985E-05	2.5718E-06
Southwest Georgia Intrastate AQCR	7.09575E-05	0.000218005	7.51258E-05	0	3.6034E-05	2.19162E-05

APPENDIX H

FLARE STRIKE POTENTIAL

Potential for Personnel Injury from Flare Strike

$$\text{Injury frequency} = \frac{\text{comp drop freq} \times \text{body area} \times \text{pop density} \times \text{Fract unprot} \times \text{MOA area}}{\text{MOA area}}$$

Example:

$$\text{injury frequency} = 6500 / \text{year} \times 3.9 \text{ ft}^2 / \text{pers} \times 55.3 \text{ pers} / \text{mi}^2 \times 0.1 \times 3.59 \times 10^{-8} \text{ mi}^2$$

$$\begin{aligned} \text{Moody 2 North MOA} &= 5000 / \text{year} \times 3.9 \text{ ft}^2 / \text{person} \times 58.14 \text{ person} / \text{mi}^2 \times 0.1 \times 3.59 \times 10^{-8} \text{ mi}^2 \\ &= 0.004070091 \end{aligned}$$

$$\begin{aligned} \text{Moody 2 South MOA} &= 5000 / \text{year} \times 3.9 \text{ ft}^2 / \text{person} \times 15.76 \text{ person} / \text{mi}^2 \times 0.1 \times 3.59 \times 10^{-8} \text{ mi}^2 \\ &= 0.001103279 \end{aligned}$$

Source of injury frequency calculation and example:

Draft Environmental Impact Statement for the Airspace Training Initiative, Shaw Air Force Base, South Carolina.
August 2005. Appendix C, Characteristics of Flares

Population Data

To estimate population data, the existing 2010 Census Population Per Square Mile data was used and averaged for all of the block groups intersecting each of the MOAs. This resulted in the average population per square mile.

North – 58.14 pop/sqmi
North – 420.7 square miles

South – 15.76 pop/sqmi
South – 536.6 square miles